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GAS JOURNAL

LIGHT • HEAT • POWER • BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

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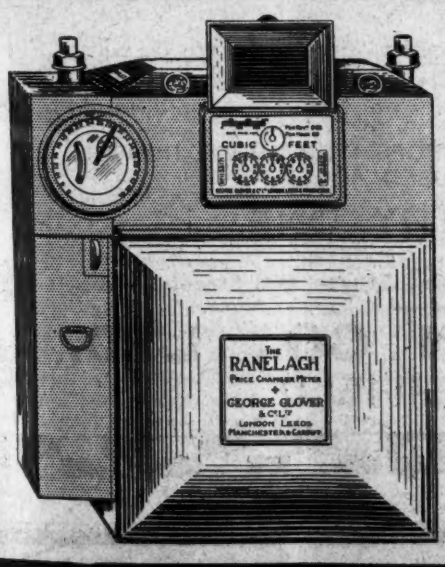

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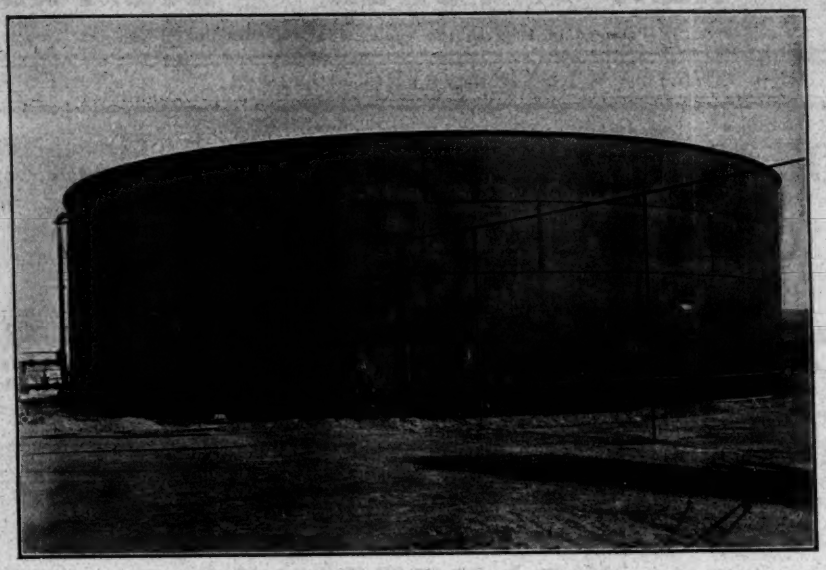

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VOL. CLVIII., No. 3075.] WEDNESDAY, APRIL 19, 1922. [74TH YEAR.

EDITORIAL NOTES.

Loan Sanctions and "Involved Procedure."

THERE have been bitter complaints that sanctions for loans applied for by local authorities for new works and extensions have been held-up by the Ministry of Health. The slow process of realizing permission to borrow is very vexatious to authorities with the large amount of unemployment about them, and especially when the work is of a character that brooks no unnecessary delay. Contractors, too, are in the same boat. They want to keep their works running, and their men employed. But it is not very encouraging to them or to the local authorities if essential work has to be postponed through procrastination on the part of a controlling Government Department in dealing with applications for loans. The matter, it will be remembered, was raised at the meeting of the Society of British Gas Industries in October last. The complaint came from more than one quarter; so that there could be no question as to there being some ground for it, and room, as well as obvious reason, for trying to expedite the sanctions. The matter has not been allowed to rest at the spoken protest. From the "Bulletin" of the Society it is learned that the Council have been in correspondence on the subject with the late President (Sir Arthur Duckham), with the result that he has had an interview in regard to it with the authorities at the Ministry of Health. They were cordial and sympathetic. It appears, too, that they did not deny delay. According to the statement in the "Bulletin," they said "that in every case they did all they possibly could to "expedite loans, but that the procedure was somewhat in-"volved, and that undoubtedly work had been held-up on "account of the discussions that have been taking place "between the gas industry and the Board of Trade on such "questions as inerts, carbon monoxide, &c." We do not for a moment question the good faith of the authorities concerned; but the statement of reasons for the delay is peculiarly interesting. The procedure is, so far as we are aware, the same as it was years ago; and there has not always been complaint. That the procedure is involved, there is no shadow of doubt; but, being involved, some effort should be made to simplify it, and so expedite the result—particularly when conditions are stressful and insistent that all possible facilities should be promptly afforded for giving relief. The circumstances plead for the "involved procedure" being reformed. As to the second part of the statement, it mentions that "work" has been held-up on account of the inerts and carbon monoxide discussions. Sanctions for loans are the subject, and not the "work" that issues from the sanctions. Really we cannot see why sanctions should have been in any way delayed by the inquiries into inerts and carbon monoxide; and what gas plant work is there the construction of which need have been deferred by the questions as to whether there should, or should not, be a limitation in these respects? However, the inquiries are at an end now, so that, if ever they were a reason for delay, they are so no longer. There is only the "involved procedure" now; and it should be an object of the Ministry of Health to get this displaced by something more in accord with good statesmanship and expeditious and efficient procedure. If this is done, good for all time will have resulted from the action of the Society of British Gas Industries. Some immediate good has resulted from their action, by the promise of the authorities at the Ministry of Health that they will at once review all cases in which gas authorities are waiting for sanctions, and push them forward as rapidly as possible.

Problem of the Use of Breeze for Heating Carbonizing Plant.

THROUGH the kindness of Mr. Ragnar Blomquist, the Chief Engineer of the Stockholm Gas-Works, we are enabled to-day to publish an article by Mr. Adolf Molin, Engineer at the same works, which describes experiences in the use of coke breeze in outside gas-producers of the Kerpely type, which are used for the heating of 46 Koppers horizontal bye-product coke-ovens at the Värta Gas-Works. Each oven is capable of carbonizing 11 tons of coal per day. The battery can be fired either by surplus coal gas from the coke-ovens or gas from outside producers. It is with these producers that the article is concerned, and the use in them as fuel of the finest, and small revenue yielding, coke breeze. Profitable consumption of coke breeze near to where it is produced, particularly if this saves coke of higher market value, is an excellent thing—more so in these days than was formerly the case. In modern gas-works practice, a fairly considerable quantity of breeze is made; and continuous vertical retorts have with steaming, and more with some classes of coal than others, yielded their increase of breeze. In Sir George Beilby's Institution paper on the steaming experiments at the Fuel Research Station, it was said: "The effect of steaming on the coke was to reduce "the size of the pieces more than is indicated by the "increase in actual breeze, while the friability was dis-"tinctly increased." The breeze from continuous vertical retorts under steaming contains a fairly high percentage of moisture, and in these days an abnormal percentage of ash. Such breeze in outside gas-producers has given considerable trouble, caused material irregularities in working, and has reduced the capacity to such an extent that insufficient gas has been made for the work to be performed.

This was the case with the producers, both high and low pressure, at Stockholm. But the great difference in market value between breeze and unbroken coke is a great incentive to striving for success with the use of breeze in outside producers. For instance, in Stockholm we believe they can only count on getting for breeze some 25 p.ct. of the price paid for unbroken coke; and, although a greater percentage of breeze has to be used in the producers than coke relative to the weight of coal carbonized, there is a considerable saving in use for heating either retorts or coke-ovens. Assuming that coke fetches 30s. per ton in Stockholm, and 18 p.ct. is required per ton of coal carbonized, the cost of the coke would be 5s. 5d. Although breeze contains a high percentage of moisture and ash, and therefore a greater amount will be required than of coke—say, 22 p.ct. of the weight of coal carbonized—the market price of breeze (0 to 15 mm.) in Stockholm being 25 p.ct. of that of unbroken coke, or 6s. per ton, the cost of the breeze for carbonizing 1 ton of coal would only be about 1s. 4d. Thus the economical advantage of using breeze against unbroken coke is no less than 4s. per ton of coal carbonized. The article by Mr. Molin in later columns is a record of the first difficulties experienced in the use of coke breeze in both the high and the low pressure producers at Stockholm—difficulties due largely to the fineness of the breeze and the large proportions of ash and moisture that it contained. The author describes the changes made in the producers which caused them to be effective when employing breeze. We will not, however, detract from the interest of the article by traversing the explanations presented by him. The main thing is that the changes have proved successful in utilizing this poor fuel for the production of the gas required for heating the coke-ovens, and so have saved for the market coke of higher value.

It is obvious that when breeze can be used for heating

purposes in coal carbonization, there must be considerable economy. The cost of erecting outside producers is more than that of the usual form of producers incorporated in the setting itself. Maintenance cost and the working expenses are also higher. Nevertheless, Mr. Blomquist tells us that, under his conditions, there has been considerable profit through the use of the low-grade fuel. In the future, he thinks it is not at all improbable the problem of the use of breeze for the heating of retorts and ovens may be solved by cheaper and simpler arrangements than those at the Stockholm Gas-Works. Anyway, it is his opinion that, if maximum good results are to be obtained from continuously worked vertical retorts, then such producers should be used, so that the breeze may be profitably utilized. The Stockholm experiences will be valuable, and will redirect attention to the question of the utilization of low-grade fuel for heating purposes in the process of coal carbonization.

The Electricity Bill Through the Lords.

The House of Lords have adjourned to May 2 for the Easter recess; and the House of Commons, are taking about a week less in the way of relaxation, and will meet again on April 26. Before the Lords went on holiday, they put the final touches, so far as they are concerned, to the Electricity Supply Bill. The financial clauses are, of course, the ones of greatest importance in the measure; but as was seen in our editorial columns last week, there have been limitations put to the powers conferred by them. In the report stage, additional modifications were made, which further change the complexion of the measure. In every respect the Government seem to be willing to compromise, while not by any means giving way to the extent desired by the opponents.

Another illustration of this conciliatory demeanour was given on this occasion. The Earl of Bessborough submitted an amendment which suggested that the consent of the Electricity Commissioners to the borrowing of money by the joint authorities should be by Order, which Order should afterwards be sanctioned by Parliament before it had effect. It was thought by Viscount Peel that this would bind the joint authorities hand and foot to such an extent that they would be unable to operate. He also pointed out that at the present time local authorities could borrow all the money they required; but if they joined together, the opposition proposed that they should not be allowed to do so. This is quite a different thing. As local authorities borrowing money for the purposes of their own area, they have direct control over the spending of the money, the sinking funds, the repayments, and all else. As contributors only to the funds required by joint authorities, they have no effective control. Any votes they possess are only parts of a total number. There is no analogy between their position as borrowers for local purposes, and their position as borrowers of money to throw into a pool for purposes not confined to their own jurisdictive area. However, Viscount Peel made it clear that the Government are anxious that the joint authorities should have all the financial facilities necessary for carrying on the work. Therefore, they were willing that provision should be made that a scheme constituting a joint authority should fix, having regard to the estimated capital expenditure, the maximum amount which might be borrowed by an authority, which amount might not be exceeded except by Special Order. This is a very indefinite safeguard. Estimates of expenditure can be made very elastic; so that the amendment the Government offered, and which was accepted (the Earl of Bessborough's amendment being withdrawn), does not really go far. The Marquis of Salisbury thought that Parliament should have some idea of what they were "letting the ratepayers in for;" but the provision the Government made will certainly not be anything of a positive nature. A further amendment is a very fair and desirable one. It provides that if there is a deficiency in revenue in any year, it shall be divided among the members of the joint authority who take a supply of electricity, and who will contribute *pro ratâ* on the basis of the number of units supplied to them. Thus any local authorities who do not take a supply will not be called upon, though lenders of money to a joint authority, to contribute to deficiencies. If anyone entertained the view that they should do so, it was a very foolish notion.

Reverting to the lending of money by local authorities on the security of the rates to outside bodies such as the joint authorities, over whose operations they have not individually any effective control—this will (if allowed) establish a pernicious principle the application of which may be carried much farther. This is seen in the Bill of the South Wales Electrical Power Distribution Company, who, by one clause, are seeking to have it enacted that local authorities may subscribe to the capital of, or lend money to, the Company. Why not extend the idea, and lend money to any other class of public utility concern or manufacturing or trading company? If allowed in one case, we see no reason why it should not be in others. There is the danger of this, besides being *in toto* unsound local finance. The gas undertakings in South Wales collectively petitioned against this lending of money by local authorities to the South Wales Company; but in the House of Lords they were unsuccessful. The Select Committee who considered the Bill in that House were of opinion that the ratepayers were sufficiently safeguarded by the fact that before a local authority could subscribe to the capital of the Power Company, the consent of the Ministry of Health and the Electricity Commissioners would have to be obtained. We do not think ratepayers are sufficiently safeguarded, nor do many other people. The whole proposal is defective. Money required for trading enterprise over which a local authority has not entire control should be privately subscribed, and not be in part or wholly furnished out of moneys raised by local authorities. The National Gas Council are going to take further steps to oppose the clause.

Higher Economy in Steam-Raising.

The steam requirements of gas-works, of course, vary according to size and processes; but, generally speaking, it may be said that steam-raising is not by any means the least important part in the operations of a gas-works. But the manner in which it is carried on (we have observed it over and over again) is often crude in the extreme. Fuel is dumped in the boiler-house, and shovelled into the boiler furnaces, and the only index to requirements being fulfilled is the pressure-gauge. There is frequently an unconscionable fuel consumption, and therefore low efficiency. The reasons for this are the availability of fuel on the works—a secondary product of the principal process—and poor supervision, or none at all worthy of the name. The subject had one of the neatest reviews that we have seen within equal compass from the experience and study of Mr. T. W. Harper, of Ayr, in the paper which he submitted at the recent meeting of the North British Association of Gas Managers, and the discussion upon which was postponed to a future meeting. The purpose of the paper was to show the seats of uneconomy, how to avoid them, and how generally to increase the efficiency of steam-raising. With some gas engineers a steam-boiler is merely a steam-boiler—something which, supplied with fuel and water, will run practically automatically, without systematic attention, until some pronounced defect makes declaration that attention is required. Meantime, probably efficiency has been on the decline, and much fuel has been wasted.

However, in the first place, Mr. Harper deals with the relative merits of Lancashire and water-tube boilers for gas-works purposes. This is a matter, of course, over which one cannot dogmatize; and the author of the paper does not fall into any error in this respect. Both types have their virtues. Water-tube boilers can boast a high efficiency; and they are rapid steam-raisers. On the other hand, Lancashire boilers are preferable for gas-works of average size. The main reason for this is that water-tube boilers are subject to more critical conditions—particularly due to their structure, and the chemical character and sediment in water. Where the water is unfavourable in character, scale incrustation reduces the capacity of the tubes; and when one remembers that (varying according to the nature of the scale) $\frac{1}{16}$-in. thickness of scale will reduce to the extent of 10 p.ct. the evaporation of water per pound of fuel, it is realized that this is serious business in respect of efficiency. With the increased pressures and consequently higher temperatures with which steam-raising proceeds today, boiler scale is augmented where the conditions are favourable to it, and the scale under these modern conditions is harder and more difficult to remove. Removal is an operation, too, requiring judicious manipulation. More time is needed for cleaning water-tube than Lancashire boilers; the difference in cost being about in the ratio of three to one. Where the water is unusually bad, replacement of tubes also becomes a serious matter. Even so

where the water is good, and a high efficiency and rapid steam production is required, the water-tube boiler is (from these points of view) the superior.

Determination of choice in such a case largely depends on the character of the water. Mr. Harper himself is able to quote an experience of ten years with a battery of four water-tube boilers during which he did not have a single tube failure—this being due to the excellent practice of using town water. For such boilers, the purer the water the better—if savings of fuel, labour, and repairs are to be effected. Of course, the question of relative cost comes in, though often overlooked. But it would be as well in some localities to consider carefully the comparative balance-sheet to ascertain whether it is more economical to use one water or another, having regard to the savings. Of course, water can be softened or otherwise treated—if it contains sulphates, it can be softened by suitable chemical agents; if it contains corrosive properties—salts or gases—these can be counteracted. But no great expense should be incurred on these directions without investigation by a competent authority. However, for longevity and reliability, Mr. Harper considers that, for gas-works use, the Lancashire boiler stands second to none; and the same can be said of the Cornish boiler. At the same time, what has been remarked as to purity of water and some of the other matters applies to this type of boiler as well as to the water-tube type. Lancashire boilers being easier of examination and cleaning, Mr. Harper advises that they should be overhauled a little more frequently than is customary—instead of twice a year, say four times; and the results in maintenance of efficiency and in the saving of fuel will well repay the additional attention. Reverting to the removal of scale, Mr. Harper very rightly regards this as an important problem. It is certainly one that has not yet been altogether satisfactorily solved, so that it can be carried on with a confidence that there will be no danger. Chipping is extremely harmful; and solvents should not be applied for softening the scale without reliable investigation into their chemical composition, as it is found that some of them have very deleterious action on metal surfaces.

Much appertaining to fuel use and economy is contained in the paper; and the utilization of coke and breeze for the firing of boilers is considered. These are days in which economy is sought by the use of lower grades of fuel. In this connection, one thing of which Mr. Harper reminds us is that the standard boiler setting is designed for the use of coal; and owing to the volume of waste gases, &c., from the furnace, the flues are built of ample dimensions. Here we have one advantage in coke and breeze. Being non-smoke producing, such spacious flues are unnecessary owing to the smaller volume of waste gases that has to be carried away. There is much better heat contact, too, with the narrower flues. It may, of course, be argued that there is the disadvantage of a more rapid filling-up with dust owing to the character of the fuel. But this is a matter that supervision and methodical attention can well negotiate. Then there is the height of the brick wall at the back of the grate. This has a controlling effect on the steaming properties of the boiler. When using low-grade fuels and forced draught, the usual height of the brick wall may be increased with advantage, particularly in the case of forced draught. But it must not be raised to such a height as to throttle the hot gases when the furnace is working at its maximum; otherwise there will be serious troubles due to local overheating. This is a sample of the instructive character of Mr. Harper's paper for those who have been negligent of, but who desire to raise, the efficiency of, and to promote economy in, their steam-raising plant. In the same way he discusses forced draught, induced draught, and natural draught; the quantity of fuel that can be burned per square foot of grate, but which may vary according to the characteristics of the fuel. There is a maximum figure according to the nature of the fuel beyond which it is not advisable to go, and beyond which one cannot go, if the maximum efficiency is desired; and, moreover, the amount of ash that can be dealt with is another controlling factor. Mr. Harper dismisses the idea that coke and breeze can only be dealt with economically under forced draught conditions. He has himself used both fuels with a Cornish boiler under natural draught—the chimney draught being as much as 6-10ths; and the results were favourable. The only drawback was that the capacity of the boiler was too small for the work it was called upon to do. It is quite true that with forced or induced draught a much larger amount of low-grade fuel can be burned per square foot of grate area than with natural draught; but there is the danger that, if the rate of combustion be increased beyond the point at which it is advisable to go, it may lead to a complicated, and even a dangerous set of conditions. "It has to be remembered, when using such fuels as breeze "and coke, that its weight is very light in proportion to its "volume, with the result that [when applying forced "draught] a considerable portion of semi-burnt fuel is "carried into the flues to lie in a state of slow combustion." The trouble, too, may arise of an amount of unburned gas being sent over from the fire; and should there be air leakages, an explosive mixture may be formed. There are these and other considerations in the paper which show potential sources of trouble that may be avoided by due care.

The utilization of waste heat is dealt with in the paper, as well as superheaters, and steam distribution. Regarding the first subject, it is noticed that, when using small coke or breeze, Mr. Harper does not see that, having regard to the capital cost, there is much advantage to be gained by adopting an economizer in combination with an exhaust-steam heater. Of course, with fuels of high volatile content, the economizer is an advantage, because the temperature of the waste gas is much higher, and the flame travel much longer. We could go on dipping into the store of practical information in this paper; but we must leave it, with the hope that, where on gas-works the efficiency of steam-raising is low, the information will be the means of effecting improvement, and of reducing appreciably the cost of steam-raising.

"The Gas Salesman."

In next week's "JOURNAL," No. 4 of "The Gas Salesman" will be published. Any communications or advertisements intended for this issue should be received not later than the first postal delivery on Monday morning. We may say that Nos. 1 & 2 are now out of print; and a few copies only remain of No. 3. We are sorry that there have been disappointments in securing extra copies; but we had no means of gauging the extent of the demand when printing surplus copies, though we asked in the "JOURNAL" for early information as to the number that would be required. There is one other matter. It has been suggested that the articles on "Figures and Facts for Gas Salesmen," which appeared in Nos. 2 & 3 issues, should be reprinted in pamphlet form. If readers will let us know the number they would require if this is done, we will, the response being adequate, at once put the printing in hand.

The Reduced Bank Rate.

The reduction of the Bank Rate to 4 p.ct. came as a nice little surprise in the City on Thursday of last week. It is not supposed that it will stimulate trade to any great extent. It may, however, help to restore confidence in the business world, and assist in breaking-down any hesitation that may be felt as to the wisdom of embarking upon new trade enterprises.

Gas Appliances Specifications.

The minutes of the Central Executive Board of the National Gas Council promise that the final report on, and specification for, the standardization of cookers will be published shortly. We understand that the Committee have gone very thoroughly into the matter, and that the report and specification will prove to be a good piece of work. Anyway, it cannot fail to lack the quality of novelty. It is evidence that the Central Executive Board themselves think well of what the Committee have done, in that they have asked them to report upon other gas appliances. In view of this, the style of the Committee will now be "The Gas Appliances Specification Committee."

Gas Coke for Steam-Raising.

We hope it will be possible for arrangements to be made for investigations into the use of gas coke for steam-raising to be carried out at the Fuel Research Board's Station. There is a large amount of experience and data available now resulting from the substantial use of coke under boilers at electricity generating stations and in other works. But the Fuel Research Board, with their facilities for working-scale exploration on a scientific basis, could do much to place us in possession of exact data, which would, in addition to their inherent value, serve as an impetus

to the utilization of a secondary product of coal carbonization, and thus promote one of the objects of the Board—coal economy. The matter is referred to in the minutes of the Council of the Institution of Gas Engineers which we publish to-day.

An Enlarged Co-Partnership.

A comprehensive scheme of bonus and other benefits has been inaugurated by the Croydon Gas Company in extension of the co-partnership system. The scheme, which includes pensions to employees and to widows and orphans, is described in our Miscellaneous News" columns.

Gas Coal Position.

Expectations are being fulfilled. The export business is improving; and the omens are that it will continue to do so—in normal directions, and through the miners' strike in the United States. Markets supplied by the latter are already making inquiries here—particularly South America. Canada is receiving supplies; and there is more activity on behalf of France and Italy. This is helping to maintain the strength of the gas coal markets, especially in the better sorts. Experience in the coalfields is varied in respect of the volume of demand for gas coals. Northumberland, Durham, Yorksbire, and Wales were all reporting strong gas coal markets before the holidays; but in other directions—Derbyshire and Nottinghamshire, for example—less activity was noted; this being attributed to the reduced consumption of gas due to the advance of the season and, owing to the state of trade, industrial demand being at a low ebb.

New Trade Union Fusions.

The coal strike of last year and other happenings somewhat closely identified with it look like resulting in new union fusions. The Triple Alliance of the miners, railwaymen, and transport workers is dead. What some of the labour unionists chose to call Black Friday of the coal strike gave the final breaking-up shock to that rather loosely constructed working partnership. It is now said that the miners may seek a new alliance with the engineers or the textile workers, both of which sections of industrial labour have vivid recollections of how they had to suffer through the mistakes and obstinacy of a majority of the miners' leaders last year. The miners' extremists would prefer linking-up in a national scheme with the General Council, while others think the Federation should preserve its own autonomy. They well remember, too, that the Railwaymen's and Transport Workers' Unions found it difficult and even impossible to work amicably with the ruling majority of the miners. Now there is a big scheme moving well towards completion to link-up the transport organizations and the three Railway Unions into one big Transport Workers' Federation. If this scheme matures, the new Federation would have a total membership of 1,100,000. The scheme will be placed before the annual conferences of the Locomotive Engineers and Firemen (May 16), the Railway Clerks' Association (May 22), the Transport Workers' Federation (June 8 and 9), and the National Union of Railwaymen in July.

The Two-Thirds Majority.

A special delegate conference of the Miners' Federation last week cleared away some ambiguity regarding the question whether a strike of the miners could be continued or discontinued by a simple majority vote. The Federation rule requires a two-thirds majority vote in favour of a strike before it can be entered upon; and the Executive proposed to remove the uncertainty that has existed by adding the words "or continuing a strike." The soundness of the rule has been proved by forty years' experience; but there is a section in the Miners' Federation who want the rule changed, so that a simple voting majority would suffice to call a strike and to continue it. The experiences of the last strike indicate that such a rule would be a constant menace, and powerfully dangerous in the hands of the extremists. The delegate conference reaffirmed the old two-thirds rule, and added to it the necessary words for making it apply to continuing a strike.

An Aniline Combine.

There are rumours of a French and German aniline combine. Denial is not given to the rumours; but it is stated that the reported terms of the proposed alliance are not consistent with the facts, information concerning which will be issued shortly.

Burden of the Rates.

This is a subject that was referred to at several gas company meetings a few weeks ago. A White Paper issued by the Ministry of Health shows good justification. It is estimated that the average amount in the pound levied in the urban areas in 1921-22 was double the average for 1913-14, and in the rural parishes considerably more. The estimated average increases were: Metropolitan boroughs (including the City), 101 p.ct.; county boroughs, 108 p.ct.; other boroughs and urban districts, 100 p.ct.; and a hundred typical rural parishes, 130 p.ct. A table shows the total amount of local rates collected in England and Wales in 1913-14 and in each subsequent year. In the year ended March 31, 1914, the total receipts from rates were £71,276,000, or £1 18s. 11d. per head of the population; in the year ended March last, the total was £173,000,000, or £4 11s. 4d. per head of the population. These are not nice figures to contemplate. In some cases there has recently been a decline in the amount levied per pound; but, on the other hand, there has been an increase in the valuations on which rates are levied. The quinquennial valuation in 1921 caused the total assessable value of all the rateable property in England and Wales to rise from £223,660,000 to £234,020,000.

Critical Position of the Engineering Dispute.

At the moment the outlook is not pleasant in the engineering industry. It seems as though the lock-out is going to extend in area enormously, and that the struggle is going to be a prolonged one. The Amalgamated Engineering Union, whose members are already locked-out, have not been taking part in the negotiations with the forty-seven other unions. These negotiations (which were entered upon hopefully, in the belief that there was a fair prospect of a successful issue) have so far come to naught; and the conflicting points of view appear to have become more stubborn. The Unions are not willing to give way on the point of the right of the employers to exercise managerial functions if, in such exercise, an order is given which might, in the estimation of any one of the workpeople, constitute a material change in working conditions. The Unions claim that, prior to any such change being made, the employers must allow an outside trade union representative to be brought into the discussion, and must also give ten days' notice, which the employers were willing to grant in cases where they considered a material change would be made. The Unions' claim is an absolute negation of the right of the employers to manage their works; and obviously to this the latter could not agree. They are naturally not disposed to relinquish their managerial functions in determining what are material changes in recognized working conditions.

PERSONAL.

The Council of the Institution of Civil Engineers have awarded a Telford Medal to Sir Henry Fowler, K.B.E., of Derby.

Mr. W. G. S. Cranmer, Manager of the Willenhall Gas Company, has been re-elected a member of the Short Heath Urban District Council; and Mr. T. Thornton, Manager of the Rowley Regis and Blackheath Gas Company, has been elected a member of the Rowley Regis Urban District Council.

OBITUARY.

The death took place on March 21 of Mr. John Williamson, the Chief Engineer and Vice-President of the People's Gas Light and Coke Company of Chicago. Deceased, who was 68 years of age, was a native of Dundee, and went to New York in 1880, removing to Chicago six years later, to take service with the Company as a foreman. During his connection of upwards of thirty years with the Company, he moved up from one position to another, and also found time to develop the Williamson process of water-gas manufacture.

Ammonium Sulphate as a Weed Killer.—As the result of experiments described in the "Journal of the Ministry of Agriculture" for March, which were carried out last year in various centres, it has been found that solutions of ammonium sulphate not only kill the weeds in cornfields, but stimulate the crop as well. A solution consisting of 2 cwt. of ammonium sulphate dissolved in water and made-up to 60 gallons was found to destroy a wider range of weeds than copper sulphate, but was not as safe to use with pea, bean, vetch, and potato crops.

RESIGNATION OF MR. ROBERT W. WILSON AND APPOINTMENT OF HIS SUCCESSOR.

Secretaryship of the Imperial Continental Gas Association.

At a Board meeting of the Imperial Continental Gas Association last Wednesday, Mr. Robert William Wilson resigned the Secretaryship after fifty years of service. He has been elected to a seat on the Board of Directors.

Mr. F. H. James, M.A., has been appointed Secretary, and Mr. W. E. Bowers Assistant Secretary.

Mr. Robert William Wilson entered the service of the Imperial Continental Gas Association on April 13, 1872, at the age of 16, on the understanding that he was to be sent to Frankfort as a pupil engineer on the Association's works there as soon as a vacancy offered. Even at this early age, his ability made itself apparent; and he was induced to give up the idea of becoming a gas engineer, and to remain at the London office. On Jan. 1, 1895, he was appointed to the post of Assistant Secretary, and one year later to that of Secretary—an office which, in the Association, carries with it the duties and responsibilities which are generally associated elsewhere with the title of General Manager. He was also appointed by the Board a Director of the Frankfort Gas Company and the Compagnie Continentale du Gaz, subsidiary undertakings of the Imperial Continental Gas Association.

MR. ROBERT W. WILSON.

During his Secretaryship, the Association has been responsible for the gas supply of Antwerp, Brussels, Berlin, Hanover, Frankfort, Prague, Flushing, Lille, Vienna, Amsterdam, Haarlem, Aix-la-Chapelle, and many other places of smaller importance; while at its maximum it had in its direct employ some 8000 men. Mr. Wilson's duties naturally took him often to the Continent; and he did much to foster that spirit of loyalty and enterprise which has always characterized this famous old Company. The extension of operations during his period of office may be gathered from the fact that when he became Secretary, the Association and its allied companies were working under some 200 contracts; but by August, 1914, these had increased to no fewer than 824.

On the outbreak of war, the majority of the Association's stations fell into enemy hands, and such contact as was maintained was through Mr. Wilson, who—by special licence of the British Government—had occasional meetings in Holland with the Association's representatives abroad. Since the armistice he has contributed much to the rehabilitation of the stations which have been recovered from enemy hands, and to obtaining adequate compensation for those which were liquidated during the war by the German Government—a journey to Berlin having been undertaken by him as recently as November last, when he successfully negotiated with the German authorities a final settlement of the Association's outstanding German claims.

It must be a source of much gratification to him that, just prior to his resignation, the Board were able to announce their intention of recommending the shareholders to approve, out of the ordinary working profits of last year, for the first time since the armistice, a dividend which is up to—in fact, above—the rate usually paid by the Association before the war. Mr. Wilson's relations with the staff, both at home and abroad, have always been of the best; and everyone will rejoice that his connection with the Association is still to be maintained, as his fifty years of service have been crowned by his election to a seat on the Board of Directors.

Mr. F. H. James, M.A., Oxon, joined the Association in 1919 in the capacity of Assistant Secretary, having previously been in the service of the Treasury. On the outbreak of war, he received a Commission in the Royal Scots. He attained the rank of Captain, and was invalided out in 1917, owing to gas-poisoning and the effects of shell-shock received during the first battle of Loos.

Mr. W. E. Bowers joined the staff of the Association from the Merchant Taylors' School in 1896, and thus has 26 years of service to his credit. He is an accomplished linguist.

NATIONAL GAS COUNCIL.

Meeting of Central Executive Board.

A meeting of the Central Executive Board of the National Gas Council was held on the 11th inst. at No. 30, Grosvenor Gardens, S.W.—Mr. Alderman Phillips (the Vice-Chairman) in the chair.

Standardization of Cookers.

It was reported that the final report and specification of the Committee was completed, and that it was hoped to have these available for members within a week or two. In view of the fact that the Board have asked the Committee to report with regard to other gas appliances, it was agreed that the Committee should henceforth be styled the "Gas Appliances Specification Committee."

Coal.

A discussion took place on the present position of the coal market, and views were exchanged regarding forward contracts.

South Wales Electrical Power Distribution Company's Bill.

Clause 13 of this Bill seeks to empower local authorities to subscribe to the capital or to lend money to the Electrical Power Distribution Company. It was reported that the collective petition of gas undertakings in South Wales against the clause had been considered by a Select Committee of the House of Lords, and had been unsuccessful, as the Committee considered that the fact that, before a local authority could subscribe to the capital of a Power Company, the consent of the Ministry of Health and the Electricity Commissioners had to be obtained, was sufficient safeguard for ratepayers. Further steps will, however, be taken by the Council to oppose the clause.

Electricity (Supply) Bill.

The measures adopted by the Council in order to obtain amendments to various objectionable clauses in the Bill so far as the gas industry was concerned were reported.

Factory and Workshop Act—Draft Regulations (Dangerous and Unhealthy Industries).

It was reported that the revised draft regulations had been circulated among members of the Committee appointed by the Council to consider this matter, and that these regulations would be studied in detail by the Committee at a meeting immediately following that of the Central Executive Board. In the meantime, it was stated that the Council had notified the Home Office of their objections to certain of the revised regulations.

District Executive Boards.

In view of the alteration in the constitution and rules of the Council as agreed on the 14th of December last, the holding of the general meetings of the various districts during April or May was authorized.

Central Executive Board.

The meeting of the Central Executive Board during the month of June will take place on Monday, the 19th of June, at 3.30 p.m., in order to suit the convenience of members who will be in London for the annual meeting of the Institution of Gas Engineers.

Annual Meeting.

The annual meeting of the Council was authorized to be held on Thursday, June 22, of this year, at 4 o'clock p.m.

Gas-Mantles.

The meeting heard with satisfaction the decision of the Divisional Court upon the case stated by the Referee appointed under the Safeguarding of Industries Act, upholding his decision that incandescent gas-mantles be not included in the schedule of dutiable goods.

Railway Rates.

It was reported that the Council had received a copy of the "Standard Terms and Conditions of Carriage of Merchandise, &c.," submitted by the railway companies to the Railway Rates Tribunal, pursuant to section 42 of the Railways Act, 1921; and any member who had experienced any special difficulty in the past in this connection, or desired to make any specific amendment, was asked immediately to communicate with the Council.

Gas Regulation Act.

A question was raised as to the possibility of a gas undertaking being allowed, under this Act, to declare two different calorific standards for different parts of its district, or in the case (say) of a supply in bulk. It was understood that it was the intention of the Act to make provision for this, and a case was cited where this had actually been done.

THE INSTITUTION OF GAS ENGINEERS.

Council Meeting.

A meeting of the Council was held at No. 28, Grosvenor Gardens, Westminster, on the 10th inst.—Mr. Thomas Hardie (the President) in the chair.

Fuel Economy Committee.

A statement was read from Mr. Douglas Helps, representative of the Institution on the British Association Fuel Economy Committee, in regard to matters which had been recently considered by the Committee, more especially with reference to the report for submitting to the next meeting of the Association.

Obituary.

The deaths of Mr. John Ballantyne, of Hamilton, and Mr. Thomas Wilson, late of Coatbridge (members of the Institution), were reported; and the sympathy of the Council with the bereaved was suitably expressed.

Candidates.

The following candidates were approved for the next ballot list: For the class of Member: Mr. James Bridge, of Elland; Mr. Albert E. Cutler, of London; and Dr. Geoffrey Weyman, of Newcastle-on-Tyne. For the class of Associate Member: Mr. John McGilligan, of Middlesbrough; Mr. Frank Southgate, of Hythe; and Mr. Cyril W. Surman, of Rugby. Mr. W. J. R. Waterfield, of Brentford, was admitted as a student.

Officers and Members of Council.

Officers and members of Council for the year 1922-23 were nominated; and it was announced that the following had been appointed as District Members of the Council for that period: Mr. E. H. Hudson, of Normanton (Manchester District Institution of Gas Engineers); Mr. W. H. Adams, of Bilston (Midland Association of Gas Engineers and Managers); Mr. J. M. Campbell, of Margate (Southern Association of Gas Engineers and Managers).

Programme of Annual Meeting.

The programme of the annual meeting taking place from Tuesday to Friday, 20th to 23rd June, was discussed and approved, and arrangements were made for the visit of the members of the Société Technique de l'Industrie du Gaz en France on the last two days.

Refractory Materials.

Mr. A. E. Broadberry, as Chairman of the Refractory Materials Joint Committee, reported action which had been taken with a view to the revision of the standard specification for refractory materials. He also reported on the work of the British Refractories Research Association.

Livesey Professorship.

A report of the last meeting of the Advisory Committee on the Livesey Professorship of Coal, Gas, and Fuel Industries at Leeds University, was given by Mr. T. Goulden, showing that very satisfactory work was being done.

Gas Coke for Steam Raising.

Consideration was given to the suggestion that the use of gas coke for steam raising should be made the subject of tests at H.M. Fuel Research Station at East Greenwich. It was arranged that steps should be taken to give effect to the Council's views in this matter.

Life of Gas-Meters.

The Report of the Life of Gas-Meters Committee, indicating the investigations and other matters which are now occupying their attention, was presented, and reference was made to a statement which was being prepared concerning the advantages of the new standard meters.

Carbon Monoxide.

The Emergency Committee reported as to the progress of the Inquiry on Carbon Monoxide which had been referred to them.

Finance.

The Report of the Finance Committee was presented, accepted and adopted.

Testing Cooking Appliances.

A proposed standard method of testing cooking appliances, which had been referred to the Institution by the National Gas Council, was considered, and it was decided to suggest that the whole question should be thoroughly investigated by the Research Sub-Committee of the Institution, and that for this purpose representatives of the Standardization Sub-Committee of the National Gas Council should be co-opted.

City and Guilds of London Examinations in Gas-Fitting.

Correspondence was reported as to the conditions of the City and Guilds of London Institute Final Examination in Gas-Fitting, in which it was pointed out that in certain districts a candidate could not obtain his certificate until he had attained the age of 23 years; it being laid down that before admission to examination he must have been working "on his own responsibility for the past two years." It was decided to arrange for a conference on the matter by local examiners in gas-fitting, after this year's examinations had been held and adjudicated upon.

ELECTRICITY SUPPLY MEMORANDA.

The development of the domestic uses of electricity other than lighting is an object of some people in the electricity industry, but not of all. The former find it hard work, with the ruling initial prices and running costs, to get beyond the limits of those people who adopt more for the sake of novelty than anything else. Those responsible electrical men who go cautiously are those who have the least worry. The "Electrician" has had a "trade promotion" special number. It often has "special" numbers. Without being in any way hypercritical, we can see nothing new in the special number that will have the professed salutary effect of promoting trade. One of the articles in it is by Mr. Alfred Williams, F.R.I.B.A. Simplicity and platitudes are its components; and we should imagine that any one of the salesmen of the electricity industry could have put together something more cogent for, and more suitable to, the columns of a technical paper. The writer apparently has mistaken the "Electrician" for a householders' paper, and not a paper that addresses itself to the technical men of the electricity industry. He tells the readers of our contemporary what they all know, that electricity has so far only been introduced into domestic life in major part for lighting; but he believes that the extension of electricity to other purposes would substantially promote domestic economy. We search the article for the evidence of this; but the most scrupulous effort fails to present us with confirmation of this very general assertion. Mr. Williams tells us of the dirt and the labour associated with the coal fire. Is there a single householder who could not have told him the same thing? He raises our curiosity when he speaks of objections to the gas-fire. This is what he says:

Domestic Uses Development.

> Gas-fires have been substituted in many cases; and, although convenient, are not free from fumes, and the tarnishing of bright metal objects near them. They also injure decorations by the deposit of small dirt, and an oily surface. A gas-fire also compares unfavourably with a coal fire financially as regards the attainment and maintenance of a proper temperature in an apartment.

That is highly interesting. Mr. Williams' experience is apparently bad, and must have been with an old type gas-fire. We have gas-fires in every room, but no fumes, no tarnishing through them, no "small dirt," and no oily surface. We challenge Mr. Williams to chemical proof of what he says, using modern gas-fires; and meantime, as applied to modern gas-fires, we regard his statement as very ridiculous. But electric heating possesses all the virtues—excepting one, which Mr. Williams has carefully forgotten to mention. He says electric-fires can be easily manipulated, and give a bright, clean, and efficient warmth in the room. As a system of warming, too, the electric fire strongly recommends itself for adoption by reason of its convenience and portability. But not a word or even a hint as to cost; not a particle of data regarding heating efficiency in relation to cost. But when he speaks of gas-fires—well, they compare unfavourably with a coal fire financially! If this is so, what about the electric-fire? Mr. Williams declines to tell his readers. The cost of the electric-fire provides uncomfortable and dangerous ground. We forgive him the omission, because we know the difficulties of the electrical position in regard to heating. It is quite safe to leave without comment what he says as to electric cooking. It is simply ("simply" in a double sense) this: "For cooking purposes, useful stoves are on the market. They are very efficient, and more cleanly than any other form. The labour in the kitchen is materially reduced. By the adoption of the numerous small appliances which can be placed on a sitting-room table for egg and water boiling, bread-toasting, &c., service is again greatly reduced."

Hiring Domestic Apparatus.

The advantage of hiring-out domestic appliances which will increase the consumption of gas or of electricity is incontestable. It is found good in the case of gas, and so it must be good in the case of electricity, with this difference—there is a much stronger disposition on the part of householders to return electric appliances before long than there is in the case of gas. People do not fall over each other to purchase domestic electric appliances for cooking and heating; and therefore it is considered that hiring-out is a good thing for cultivating such a desire for appliances that purchase will follow. Of course, hiring can also influence the other way. It may show the hirer so much that is not altogether to the credit of the appliance, that it may induce him to decline to have anything more to do with it, and to tell his friends that this is his deliberate judgment. However, Mr. W. F. T. Pinkney, in an article in the special number of the "Electrician," is of opinion that hiring will result in securing some profitable consumers. In his view electric irons, kettles, fires, and cookers are the appliances most valuable for hiring purposes. Water-heaters and washing-boilers may also be considered; but he pushes aside such things as vacuum cleaners, washing-machines, dish-washers, polishing-machines, &c., as, apart from the rentals, they yield practically no revenue. We will not argue whether this selection is right or wrong; there was a salesman's conference recently at which the contrary was the view prominently expressed. There is one

thing which Mr. Pinkney says with which we do agree. It is that "with [electric] cookers it is desirable to keep the rentals as low as possible, in order to encourage their use." We quite believe this, and so shall not dispute it. Another point with which we are not disposed to quarrel is that hiring should include maintenance and prompt service. This is very necessary in view of the propensity of electric appliances to break down. Both in cookers and fires, Mr. Pinkney advocates as few designs as possible, in order, in connection with maintenance, to keep the stock of replacement parts as low as possible. The form of hiring agreement should be as short and simple as possible. We observe among the conditions that six months' notice should be required to terminate the hire. We know that in certain electricity undertakings there has been some bad experience in the frequent return of hired apparatus. An interesting table is included in the article, showing the cost of apparatus and the rentals received in the Newcastle district. Here it is:

Apparatus.	Net Cost.	Retail Prices.	Average Maintenance Cost per Annum.	Rental per Annum.	Approx. Units Sold per Item per Annum.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	
Iron	0 12 8	1 1 0	0 1 0	0 6 0	35
Kettle, 2-pint .	0 16 0	1 10 0	0 2 8	0 8 0	50
,, 3- ,, .	1 10 0	2 10 0	0 2 8	0 10 0	70
Fires . . .	1 10 0	2 12 6	0 2 7	0 12 0	500/1000
Cookers. . .	12 10 0	22 0 0	1 0 0	1 10 0	1600
,, . . .	16 0 0	25 0 0	1 0 0	2 0 0	1750

The figures are highly interesting. For example, take the net cost of a 2-pint kettle, 16s.—on this a rental of 8s. per annum is charged! Take a cooker the net cost of which is £12 10s.—the rental charged is £1 10s. If this rental includes average maintenance of £1, then there is only 10s. left, which is not a striking sum for interest and replacement on an article costing net £12 10s. The table illustrates one of the struggles incidental to this hiring-out business in electric appliances.

The Landlord and Assisted Wiring.

Many schemes of assisted wiring have been proposed. The hiring powers conceded under the Electricity Supply Act of 1919 have caused the idea to have very considerable resuscitation; and upon practically every person who has ventured to advocate a scheme, there has fallen quite an avalanche of condemnation of his proposals. Those who condemn most are those who have been most severely bitten by indulging in speculative ventures of the kind. What is wanted is to remove the element of speculation. Mr. J. R. P. Lunn, of Darlington, thinks, or hopes, he has invented a plan which will positively clear away all danger of loss. He suggests that a householder shall enter into his own arrangements with a wiring contractor for an installation, and that the local authority shall pay the contractor, subject to an agreement being entered into between the authority, the consumer, and the landlord. By this the consumer would pledge himself to pay for the installation in (say) twenty quarterly instalments; and the landlord would undertake to continue to pay should the tenant leave the house before the end of five years. We rather anticipate that most landlords would decline to be parties to any such arrangement or obligation. But Mr. Lunn is seductive. He points out how much the landlord's property would be improved; how cheaply he would get his houses wired; and how, if a tenant left before he had concluded paying for the wiring of his landlord's house, the landlord would be able to increase the rent to the next tenant to an amount sufficient to pay for the quarterly instalment cost of the wiring. We can see both tenants and landlords entertaining some doubts as to where they would profit. Tenants of houses are not keen over spending money on their landlord's property; and, rents having reached top notch, and the public grumbling heartily over the matter, landlords are not by any means anxious to shoulder a responsibility which will necessitate higher rents. We do not blame them. Mr. Lunn himself seems a little uncertain of his suggestion's meeting general approval. He asks if anyone can point out where his scheme might go wrong. We do not think he need worry himself about that.

Optimism.

The "Electrical Times" believes there are tens of thousands of substantial householders who could be secured by an offer of extended credit. If they are "substantial" householders, why should they require the temptation of extended credit? We are under the impression that Mr. Lunn has in view householders who can hardly be described as "substantial." It is thought by our contemporary that apparently too much importance is attached to the rather unfortunate experiments of twenty years ago. "Meteor" is the writer. The unfortunate experiments of twenty years ago had successors; and they kept up a running tale of unfortunate experiences until war time. He, however, points out (and so throws cold water on the proposal) that "where the undertakers are local authorities, deferred payment schemes are possible only if explicitly sanctioned by a Private Act. Although the Electricity Supply Act of 1919 gave all undertakers present and to come full powers to provide and let on hire wiring, and consuming devices of every description, the power to *sell* was not given." He therefore urges that of the possibilities of the right to hire, the utmost use should be made. "Meteor" thinks that wiring once in will almost certainly be used by succeeding tenants; as tenants "will not revert to gas lighting nowadays." History has a strange way of repeating itself. However, he holds that conditions are to-day enormously changed for the better, and rental wiring should be a paying proposition given judicious planning of the scheme and discrimination in applying it. Again we may say that history has a habit of repeating itself.

Continued Poor Street Lighting.

A writer in the "Electrical Times" expresses something which we often feel in our nocturnal travels. Some authorities responsible for lighting have altogether lost interest in the standards of street illumination to which we had moved or were moving prior to the war. Street lighting suffered a tremendous set-back through what perforce happened during the war. Since then, some local authorities have recovered their pre-war lighting ideas, but countless others have not done so. In neglect, they find a certain amount of economy; and so many have made no attempt whatever to bring their street-lamps into any consonance with their pre-war state. Numerous lanterns still contain small units of light placed there through the decree as to diminution of illumination. The article in our contemporary asserts that, though there has been three years' peace, much of the public lighting is no better than it was in 1914—indeed, in some places it is actually worse. Street lighting has been set on one side as one of the things that can wait; seeing that the time that has elapsed since the armistice has been fairly well occupied in getting things into order at the generating stations (the writer says nothing about gas-works), and with more or less continuous coal and labour troubles. But approaching more nearly normal conditions, it is thought that it will be a reproach if the technical advances that have been made in lamps and their accessories during the past eight years are to be much longer side-tracked. Somebody must take the initiative; and it is thought the station engineer is the man. The gas man is apparently altogether out of it—on paper. There is the expense. The writer of the article snaps his fingers at it. By a "trifling" capital outlay, it would be possible to reduce the yearly lighting bill, and at the same time give an improved illumination. He speaks of what modern fittings will do. Manifestly he has in mind gasfilled electric lamps, formerly known as the half-watt, until people learned they were masquerading under a false name. But these high efficiency lamps are only so at their source. The higher the efficiency, the shorter the ray lengths; consequently, the light is more concentrated. A result is that they necessitate auxiliary aids of a character which will hide their high intrinsic brilliancy, and improve the distribution of the light. The writer of the article does not say all this. But he does advise that where local authorities are reticent in the matter of expending money on street lighting, electrical engineers should do something to make a start in creating and energizing the desire for better lighting by installing a few specimen modern lamps.

Oil Fuel and Steam-Raising.

The burst of enthusiasm that there was over oil fuel for electricity generation during the coal strike last year soon waned when coal and coke were again available; and now we think it may be said to have vanished entirely. The truth is that even at present reduced prices, oil fuel for steam-raising for electricity generation cannot compete with coal at current costs; and less will it be so when coal gets to still lower prices. This the oil people themselves admit, though advancing subsidiary advantages for oil fuel which they claim are worthy of financial and other recognition. It appears that fifty-three electricity supply stations made use of oil fuel during the strike. We should have imagined there were more. Some results of inquiries into the matter have been tabulated by the Incorporated Municipal Electrical Association. The costs of installation, as we mentioned at the time, varied enormously—so much so that the reason for some of the charges was altogether inscrutable. But we were not prepared to learn that the cost of installation showed the remarkable variation between £6 and £3600 per boiler. The Bath electricity station holds the honour for the £6. In its case the work was carried out in the Department's own workshops with old material; while the burner was also home designed. Even so, the cost is remarkable for its smallness However, the point is that oil fuel has been proved to be useful for electricity generation, but not permanently economical for that purpose when used under boilers for the raising of steam. When employed in internal combustion engines, a very different tale is told.

Annual Conference of the "B.C.G.A."—The annual conference of the British Commercial Gas Association will take place on Oct. 16, 17, and 18, at Bristol.

Southern Association of Gas Engineers and Managers (Eastern District).—The next meeting of the Eastern District of the Association will be held at No. 28, Grosvenor Gardens, S.W., on Tuesday, April 25, at 2.30.

BUILDING TRADES EXHIBITION.

Interest for all at Olympia.

This year's Building Trades Exhibition at Olympia—which is to remain open until April 27—completes a series of three held annually; and in future years, beginning with 1924, the exhibition will again become a biennial fixture. This reversion to former practice is certainly not the result of lack of interest; for on the present occasion it is stated that, so great has been the demand, every available square inch of space has been allotted—and every exhibit is directly connected with the building industry. The field is, of course, a wide one; and the displays are proportionately varied. Two very extensive sections are concrete construction, machinery, and plant, and road construction—including special tar preparations, tar-sprayers, tar-boilers, &c. With these, however, and some other interesting things it is impossible to deal individually. Before passing to such of the stands as call for specific notice here, it should be remarked that the value of the exhibition is enhanced by the arranging of a number of meetings and conferences in connection with it. Glancing down the programme of these, it is seen that at a conference of the Institute of Clay Workers on Monday, April 24, Dr. J. W. Mellor (Principal of the Central School of Science and Technology, Stoke-on-Trent) will speak on the subject of gas-firing from this particular point of view. Last Wednesday the Junior Institution of Engineers were at Olympia.

Near the main entrance, the Davis Gas-Stove Company have an attractive display on a stand so arranged as to enable them to show in action a number of their most handsome patterns of gas-fires, as well as others of a less expensive type intended primarily for use in connection with housing schemes. The former include the "Hotspur," "Carleon," "Standen," and "Patrician;" and the latter, the "N.H." cast-iron gas mantel register and the cast concrete gas mantel register. A little portable heater of a novel character, so far as gas is concerned, is the "Garba," which consists of a mantle fitted in the centre of a polished copper reflector attached to a stand. The height over-all is about 18 in., and the diameter of the reflector 14 in. By this means, heat can be provided precisely where it is wanted. Being connected to the gas supply by flexible tubing, it can be readily moved about a room, or taken into other apartments, as required. It is provided with reliable gas and air adjusters, by means of which the gas consumption can be economically regulated. The consumption is very small. There are the No. 118 cooker, with "Efficiency" hotplate, and the "Metrocom" gas-range on stand—a handsome and convenient installation consisting of an oven surmounted by a hot closet, with hotplate at side, and fitted with a plate rack and a white enamelled back plate. In other parts of the stand are geysers of numerous patterns and sizes, for baths, sinks, and lavatories, "Nautilus" grates, Danish coke-stoves, gas-irons, gas-incinerators, "Sentry" coke-boilers, &c. As is particularly fitting in an exhibition of this character, the "Nautilus" concrete gas-flue, with a fire in action, is prominently placed, in order that architects and builders may not overlook the economy of this system of construction. Altogether it is an effective demonstration of the manifold efficient and labour-saving uses of gas.

Another stand which makes a direct appeal to the gas industry is that of Mr. Thomas Potterton (whose exhibit takes that firm's usual form) in drawing the attention of architects, building contractors, and general public to the great strides that have been made in the equipment of hot-water and heating apparatus to meet both domestic and trade requirements. There is to be seen a working example of domestic hot-water supply apparatus thermostatically controlled, which is in constant action, showing how efficiently a general service can be maintained throughout the day, where occasion demands; but, alternatively, there are fitted on the stand separate complete units, which are provided to demonstrate the quickness and precision with which hot water for intermittent uses—for instance, at the sink or lavatory basin—can be obtained. The firm have always recognized the great advantage of being able to provide high-temperature water in small quantities; and to this end the cut-out valve system was patented by them in 1904. With the same object in view, their boilers are designed with pipe sizes such as promptly to produce in the water a circulating temperature of 80° Fahr. above normal cold supply, by which means water at a useful degree of heat is rapidly secured. Another installation is in operation demonstrating the efficiency and convenience that are secured by the use of gas heating for warming purposes, by means of circulating radiators. Opportunity may be taken later to refer in more detail to this system, installations of which have recently been made in London. Controlled by Potterton's air thermostats, the efficiency conditions are excellent. The firm now manufacture apparatus of the rustless type, suitable for use in districts having a soft water supply.

Elsewhere in the exhibition, Potterton plants are to be found applied to practical uses. At the stand of the Staines Kitchen Equipment Company, Ltd., there is a "Channel Race" patent electrically driven crockery washer, capable of dealing with about 1900 plates an hour, for providing hot water to which there is a Potterton new combined installation, in which the boiler and storage are in portable form and rectangular in shape, being designed to occupy the least possible space. It supplies water at the high temperature which is required for such culinary purposes, and has an output of 40 gallons per hour, which is sufficient for demonstration work of this kind, though the flexibility of the "Victor" system renders it possible to increase the amount. Then Mr. George Blay shows a simple and inexpensive type of bungalow produced from twin portable army huts, erected with a kitchen formed between, in which a sink for general wash-up purposes is supplied with hot water by a small and compact "Victor" complete apparatus. This example is evidence of the advantages offered by gas for the meeting of present-day requirements, as it alone renders possible the occupation of a building of this kind.

Messrs. Ewart and Son, Ltd., show all the latest patterns of their geysers—many of them in operation. There is the "Victor" geyser, with shower attachment—this method of working, it is pointed out, requiring only a few gallons of hot water instead of about 30 gallons for a bath, thus effecting a considerable saving in gas and water. It can be used with a sheet-metal footbath, thus saving the cost of the usual enamelled cast-iron bath. The firm's new gas-heated copper, the "Boilo," has several features of its own. By the introduction of a spun-steel top, carefully coated with pure tin after manufacture, the risk of breakage is entirely eliminated; and the maximum strength and durability is obtained with the minimum weight. All the parts are interchangeable and detachable, and may be replaced and fitted without skilled labour. Careful attention has been paid to the construction of the "Boilo" with a view of obtaining rapidity in heating and economy in gas consumption. The combined steam and outlet ventilating socket is said to ensure efficiency.

The "Hurry" Water-Heater Company make geysers and gas-heated furnaces in different sizes, which have been supplied for installation in connection with a number of large housing schemes. The Stimex Gas-Stove Company, Ltd., exhibit their cooking, heating, and hot-water supply specialities. The Carron Company also, among their handsome grates, &c., display samples of the "Stella" pattern gas-fires and gas-cookers. Messrs. George Waller and Son, Ltd., show a diminutive "Pinkney" gas-engine of 1 B.H.P. This type of engine is made in sizes from ½ to 5 B.H.P. A "Turbine" kettle, with attachments at the bottom designed to concentrate the gas-flame, is claimed to economize gas. It is marketed by Messrs. J. T. Hayter & Co. The stove of the "Gas-saver" Cooker Company, Ltd., is one of the portable variety, intended for use over a gas-ring, the heat from which is distributed through three channels to the oven and two boiling holes. If desired, the oven can be removed bodily. Another "one-ring cooker"—the "Wifesjoie"—is displayed by the London Warming Company, Ltd. This can be combined with a copper boiler and 20-gallon hot-water cylinder. The Lawson gas-heater is also on view.

The Aerograph Company, Ltd., draw attention to their spraying equipment for indoor or outdoor painting, varnishing, &c., of every description; and Messrs. Thomas and Bishop, to their "Permac" imperishable jointing cement, which is suitable for use on every kind of joint. Those desirous of having a preservative for all outdoor woodwork or a decorative stain for indoor work in all classes of buildings, will find it in the "Solignum" of Messrs. Major and Co., Ltd., and the "Silvertown" wood preservative of Messrs. Burt, Boulton, and Haywood, Ltd. The usefulness of the "Novoid" speciality of the Torbay and Dart Paint Company, Ltd., for rendering concrete weather, water, and oil proof, is demonstrated on more than one stand. Among the goods shown by Messrs. Stothert and Pitt, Ltd., is the Feuerheerd liquid rotary pump, which is capable of application to almost every condition under which liquid or semi-liquid is dealt with, excepting where the liquid carries grit in suspension. It is particularly suitable for liquids of low viscosity, such as tar and fuel oil. The Sturtevant Engineering Company, Ltd., show fans for various purposes.

Consumers and their Meters.

A circular headed "The Gas-Meter and Gas Bills," prepared by the Gas Inspection Division of the Department of Public Utilities of the Commonwealth of Massachusetts, is intended to assist consumers, who are strongly recommended to read their meters, both for their own satisfaction and in order to detect any unusual or undesired use of gas. The method of reading is fully explained; and it is pointed out that, as gas cannot be seen and its rate of use be determined in a manner common to other commodities, like coal or oil, the gas-meter assumes considerable importance. Experience gained over a long period has shown the Department that comparatively few meters are fast or register against the consumer, and that the average error of such meters as are fast is less than 5 p.ct., including the 2 p.ct. tolerance. As the average complaint of high bills is not generally answered by this percentage of error, the cause should be sought elsewhere. Of course, as the circular states, the term "high bill" is relative. A high bill for one consumer might be a low bill for another; and before making complaint, the consumer should investigate conditions. The most important thing is to read the meter. If the meter has been read weekly by the consumer before a bill is rendered, and the company's reading is found to be correct by the consumer's reading, and if the calculation of the amount of gas used and the sum charged is correct, it is fair to conclude that the bill is right. If still in doubt, the consumer should test the rate at which his appliances use gas; and by calculating the number of hours use, an estimate may be made of the amount of gas consumed.

THE HIRD PROCESS OF TAR DISTILLATION.

Practice in a Gateshead Coke-Works.

At a meeting of the North of England Section of the Coke-Oven Managers' Association held recently at Darlington, Mr. J. Curry, of the Teams Coke Works, Gateshead, read a paper on the "Hird Process of Tar Distillation." Mr. T. H. Nicholson presided.

Mr. Curry said that the ultimate results of the distillation of coal tar greatly depended upon the manner in which the tar was recovered and on the nature of the coal. The specific gravity of the tar varied between 1·090 and 1·215, according to the temperature of the carbonizing retort and the kind of oven employed. Lower gravity tars were generally produced where low temperatures prevailed, and high heats produced higher specific gravity tars. In practice, coal tar in distillation was split-up into the following chief fractions: Ammoniacal liquor, crude naphtha, light oil, creosote, anthracene oil, and pitch. The following tables were given as comparative analyses of coke-oven and gas-works tar:

Distillation of Teams Works Tar on Dry Sample (Volume).

Per Cent.		Deg. C.
0·65	..	170
0·15	..	170 to 230
3·86	..	230 ,, 270
5·60	..	270 ,, 300
21·65	..	300
68·09	..	Pitch of softening point 58° C.
100·00		

Gas-Works Tar.

Per Cent.		Deg. C.
2·44	..	170
2·15	..	170 to 230
10·60	..	230 ,, 270
5·70	..	270 ,, 300
14·75	..	300
64·36	..	Pitch of softening point 59° C.
100·00		

It would be seen by these analyses that the amount recovered up to 270° C. in the coke-oven tar was only 4·66 p.ct., whereas in gas-works practice the amount recovered was 15·19 p.ct. Describing the plant, he said that the 20 ton per day plant at the Teams Works consisted of four stills with separate heat exchangers and condensers, eight overflow boxes, pitch cooler, and tar supply regulating tank. Nos. 1, 2, and 3 stills were built of cast-iron, 9 ft. long by 3 ft. wide by 3 ft. 6 in. depth inside, and were made in three sections; the thickness of the metal being 1 in. throughout. The still ends were made of ½ in. mild-steel plates. No. 4 still was of ½ in. mild-steel bottom and end plates, and the sides and tops ⅜ in. plates. Each still was fitted with three 6 in. internal diameter solid-drawn steel tubes, ¼ in. thick, and were expanded into the end plate. No. 4, or the mild-steel still, had two 6 in. tubes, and was fitted with a perforated steam pipe. Cast-iron baffle-plates were fixed in each still.

The four stills were connected, and the burners were of the ordinary bunsen type; the waste heat from Nos. 1, 2, and 3 stills passing under No. 4 still before going to the chimney. The pitch cooler was of the same size and construction as No. 4 still. There were four heaters, each 3 ft. in diameter, and 6 ft. deep, made of ⅜ in. plates; the top plates being bolted on. In each heater a 4-in. cast-iron coil was fixed, the top of which was connected up to its own still by means of a 9 in. to 5 in. taper pipe and 9 in. bend. The heaters were coupled together so that the tar flowed in at the top and out of the bottom of each heater. There were five condensers—one to each of the four stills and heaters and one coupled up to the 4 in. main from the top of the heaters. The condensers were 3 ft. deep, 2 ft. 6 in. wide, and fitted with a 4-in. cast-iron coil. The crude tar was pumped from the storage tank to the overhead feed tank, and from that tank it flowed through a series of four heaters. On passing through those heaters the temperature of the tar was raised to 250° Fahr. by its receiving heat from the distillates leaving the stills as they passed through the coils. The water and naphtha given off during its passage through the heaters were carried to a condenser and then to storage tanks.

Considerable trouble was experienced in the fourth heater, due to frothing caused by the amount of water in the tar and the high temperature in the heater. This caused a pressure in the heaters and stills which lifted the safety valves and blew the pitch out of the pitch cooler, to the great risk of fires. To overcome this they lowered the tar level in the last heater; giving more vapour space and thereby minimizing the pressure. The tar, on leaving the fourth heater, entered No. 1 still, which was fitted with baffle-plates, so that the flow of tar was controlled. The temperature in this still was 500° Fahr. There the balance of ammoniacal liquor and crude naphtha was distilled off. Leaving No. 1 still, the tar entered No. 2 still, in which the temperature was raised to 630° Fahr.; and during its passage therethrough the light oils were driven off. Entering No. 3 still, its temperature was increased to 730° Fahr.; and at this temperature the creosote oil came over. Entering No. 4 still, the temperature was actually reduced to approximately 610° Fahr.; this reduction being brought about by introducing steam into the still through a perforated pipe to drive off the anthracene oil. The residue pitch then passed through the pitch cooler into the bay. The temperature of the pitch leaving the cooler was 380° Fahr. The depth of tar in the stills was 3 in. above the tubes, which left 2 ft. 3 in. vapour space above the tar level. They had found that any increase in the depth of tar meant reduced output.

The creosote oil recovered was pumped into shallow pans and over strainers, and allowed to settle and crystallize the naphthalene before storing. The anthracene fraction, in its crude state, contained 20 p.ct. of paste. This was heated with steam and pumped into tanks containing perforated pipes. The contents of the tank were agitated with compressed air for a time, and were then allowed to settle and run through a centrifugal whizzer fitted with a copper gauze covered with a filter cloth. The oil recovered had a specific gravity of 1·110 to 1·115. The anthracene paste left in the machine was up to 25 p.ct. purity. The purification of anthracene was not carried any further.

The gas used was 5000 c.ft. of 450 B.Th.U. per ton of tar distilled. Where gas was available, it was undoubtedly much better for regulating temperatures than breeze firing. The life of the tubes in the stills varied. That of No. 1 still was 18 months; No. 2, 12 months; No. 3, 14 months; and No. 4, three years. The end plates in the stills, not being of cast iron but of mild steel, suffered from corrosion and pitting, due to the amount of ammonium chloride in the tar. The quantity of ammonium chloride in Teams tar averaged 0·556 p.ct. To overcome this difficulty they washed all the tar before distilling. The washing process they had adopted was to run 12 tons of tar into a tank, add 10 p.ct. of water and agitate with live steam for eight hours, allow it to settle, and decant the liquor. The tar, after washing, contained 0·113 p.ct. of ammonium chloride. That had considerably added to the efficiency of the plant by reducing repair cost, and made fewer blockages in the still head pipes.

Among the advantages of construction, Mr. Curry cited the following: The plant would run thirty days without cleaning; there were no bolts or rivets in contact with the bath of tar or fumes within the still; the stills were not subject to external bottom heat; the end plates and tubes were the only parts of the stills subject to depreciation, and these could be removed fairly easily and quickly, as the end plates were bolted and not riveted. The method of firing by gas burning in the tubes was economical; and the heat was applied into the body of the tar and not to the outside of it. The continual flow of tar tended to keep the stills clean, and minimized the amount of carbon on the tubes. The continuous working eliminated a loss of heat which occurred in pot-stills due to the emptying and filling-up necessary. The labour employed was small—one man per shift running the gas-fired plant.

DISCUSSION.

The Chairman, in opening the discussion, said he would like to know what was the amount of water in the tar before distillation. He was afraid there were but few of them present who had much practical experience of tar distillation for the time being; but they would all be interested to know whether, in the Hird process, the quality of the pitch could be varied.

Mr. Curry said the amount of water was about 5 p.ct. With regard to varying the pitch, they found this presented no great difficulty. It depended mainly on the gas pressure and the amount of tar put through the plant.

In answer to Mr. T. Westhorp, the author said the fractions were finally adjusted. It was the case that if the temperature was brought up in the first still, the third was bound to come up in proportion.

Mr. T. Forster asked if the plant could "cut" the different fractions of oil independently of the pitch at the finish.

Mr. Curry replied in the affirmative.

In reply to Mr. Knott, Mr. Curry said that about 5000 c.ft. of gas per ton of tar was used. During the coal strike, gas not being available, they fired with breeze, and obtained fairly satisfactory results, though not quite up to the mark, on account of the restricted grate area. Given a larger grate area, he thought there would have been better results. It was continuously fired like a boiler, and did not cause lowered temperatures, as he rather anticipated it would.

Replying to Mr. Westhorp, the author said that most of the cleaning necessary was on the second and third stills. He had never found any sign of buckling in the third still.

After elaborating some of the points raised in the paper, Mr. Curry, answering a question regarding the labour required to run the plant, remarked that it was important to remember that while he had said that one man per shift was running the 20-ton plant, it was just as easy for the same labour, without any assistance, to run a 40-ton plant.

Mr. J. Porteous made an allusion to an interesting process for distilling tar which had come to his notice recently. Though he could not go into details, broadly speaking it was a system which had been patented for distilling tar by passing it over a molten alloy. The tar came in direct contact with the molten alloy, and distilled immediately. A feature of the plant, he understood, was the very small space it occupied. A laboratory experimental plant was doing ten tons per day. He had good reason to believe that the fuel consumption was low, and the fractions just as easy as in any other plant.

Mr. Curry was thanked for his paper.

At a meeting on Friday evening, April 28, at the Westminster Technical Institute, Mr. J. W. Lofts, of Messrs. William Sugg and Co., Ltd., will address the members of the London and Southern District Junior Gas Association on "The Vast Opportunities for Artistic and Efficient Gas Lighting"—illustrating his remarks by lantern slides.

PRODUCERS FOR BYE-PRODUCT COKE-OVENS.

THE VÄRTA GAS-WORKS, STOCKHOLM.

By Mr. Adolf Molin, Engineer, Gas-Works, Stockholm.

During the years 1914 to 1918, new ovens were erected at the Stockholm Gas-Works, situated at Värtan. The installation consists of 46 Koppers horizontal bye-product coke-ovens, each having a capacity of about 3500 cub.m. of gas per 24 hours, and holding some 11 tons of coal.

Gas for Heating the Ovens.

For heating the ovens, either coal gas or producer gas may be used, depending upon the demand for coal gas in the town and for coke for domestic or industrial purposes. Thus, in summer time, when the demand for coal gas is less, it is possible to use part of it for heating the ovens, the rest being sent to the town. This, of course, is provided the demand for coke is heavy, or the stock at all likely to be insufficient for the coming winter. In winter time, however, when the demand is so great that all the coal gas produced in the coke-ovens is necessary for the town, producer gas is used for heating the ovens. Of course, it is also possible to heat a certain number of the ovens with coal gas and the remainder with producer gas.

The Gas Producers.

For generating the producer gas, there are six producers in a building separated from the coke-ovens. Three are of the high-pressure type, and the others low pressure. They are all of the Kerpely pattern, with revolving grate of conical shape; the top of the cone being arranged eccentrically to the producer shaft, thereby causing a breaking action on the clinker when the grate is rotated. The air and steam were at first introduced through a number of circular openings spread all over the surface of the grate; but these grates are now being superseded by others consisting of a number of conical rings spaced apart so as to leave only narrow air spaces. By this arrangement, the air is more evenly introduced into the producer shaft than by circular openings, which could easily be clogged-up, thus causing bad combustion at certain parts of the grate and bad working of the producer, with many difficulties in clinkering. With the new grates, also, the air pressure necessary is less.

The High-Pressure Producers and Coke Breeze.

The high-pressure producers were constructed for coke breeze, of 0 to 15 mm. screen; and on account of the fineness of this material, it would be necessary to use an air pressure of 300 to 400 mm. This rather high water column pressure would make it impossible to use a water-sealed clinkering device; and these producers are, therefore, air-tight in the lower part. The ash and clinker are accumulated in a closed pocket or chamber, from which at intervals they are discharged into wagons placed beneath the chamber. While the ash is discharged, the air and steam are cut off. The shaft of the high-pressure producers is about 3100 mm. high, and has an internal diameter of about 2600 mm. To a height of about 1700 mm. from the bottom of the shaft, the producer wall is water-jacketed. The upper part of the shaft is, however, of firebrick lined plate. The water in the jacket becomes heated to 90° to 95° C.; and this water is used partly in the boiler-house as feed water, and partly by the producers themselves in the steam-raising device to be described. For charging the coke there is a hopper of the usual type, with provision for preventing escape of gas during the operation. The stirring holes are provided with an air pressure device for obviating the escape of gas during stirring.

At the time the producers were put into operation (May, 1918), the coal in store had a very high content of ash (up to 20 p.ct.), so that the coke—and especially the coke breeze—from the coal contained about 25 p.ct. and more of ash. This made it impossible to use breeze of the size already mentioned, because the clinker so obstructed the air passage that the capacity of the producers became too low for the bye-product coke-ovens. According to the contract with the firm of Messrs. Julius Pintsch, who supplied the gas-producer plant, the high-pressure producers should be able to gasify 12 tons of coke breeze of a size up to 15 mm. in 24 hours; but the coke breeze should not contain more than 36 p.ct. of water and ash together. In the fuel then available, the ash content was, as stated, 25 p.ct. and more; and the water content varying between 15 and 20 p.ct., the combined ash and water was considerably higher than stipulated in the contract. It was, however, essential to generate sufficient quantities; and there was therefore nothing else to do but use coke of greater size—viz., 15 to 25 mm.—with which it was possible to maintain the capacity of this part of the plant.

The pile of coke breeze grew, however, greater and greater; and it was necessary to try to solve the problem of the utilization of this breeze. As already mentioned, the stopping of the air passage was due to the great quantity of ash and clinker; but there was naturally, also, another cause of trouble. The material to be gasified consisted of from the finest particles up to pieces of 15 mm.; and, of course, the finest particles so closed the space between the bigger particles that the resistance for the air became too great in the comparatively high layer of breeze in the producer. When charging, the particles of different sizes also separate; the finest being left in the middle of the shaft, and the greater ones rolling out to the walls. Thus the resistance to the air would be less at the walls than in the middle, resulting in too hot working in the vicinity of the walls. Consequently the clinker would adhere to the walls of the shaft, causing trouble during cleaning. As a result of this bad working condition, the gas generated would show a rather wide variation in its composition.

Difficulties Overcome.

To avoid these difficulties, it was decided to screen the breeze in two different sizes—viz., 0 to 6 mm. and 6 to 15 mm. For this purpose, the screening machinery was provided with an iron net with 6 mm. openings below the screen-plates with openings of 15 mm. diameter. The openings in the net, however, became plugged-up by rust, on account of the moisture of the breeze. It was then determined to use a net of brass; and with this the screening was efficiently carried out. Coke of 6 to 15 mm. was then gasified in the high-pressure producers; and it was so successful that the capacity of these producers with this sort of coke now is between 17 and 20 tons per 24 hours. The necessary air pressure is between 160 and 200 mm. water. The breeze of the size of 0 to 6 mm., in spite of its fineness, is now burned for steam-raising purposes on travelling-grate stokers, delivered by The Underfeed Stoker Company, of London. These stokers are specially designed for low-grade fuels, and have been in use at the Värta Gas-Works for several months with very good results with regard to capacity as well as to the thermal effect.

Experiences with the Low-Pressure Producers.

As regards the low-pressure producers, they were originally constructed for coke between 15 and 25 mm., with a maximum content of water and ash together of 20 p.ct., in which case the capacity of each producer should be 18 tons of coke per 24 hours, according to the contract. They have a water-sealed clinkering device; the ash and clinker being automatically delivered into wagons. The air pressure beneath the grate cannot here be above 200 mm.; this being the height of the water-seal. The shaft of these producers is of about the same internal height and diameter as that of the high-pressure producers. The walls of the shaft consisted, however, originally only of firebrick lined steel plate; no water-jacket being provided in the lower part.

As stated before, the quality of the coke available at the starting of the producer plant was very bad. This also was the case with the size of coke to be used—15 to 25 mm. The ash content was then about 20 p.ct., and the moisture between 10 and 15 p.ct. Consequently, the fuel was not of the quality for which the above-named capacity was guaranteed. When an effort was made to use the size of coke for which these producers were constructed, it also soon became evident that it was impossible to employ this sort of coke. The capacity of the low-pressure producers was so low (about 15 tons of coke per 24 hours) that it would have been impossible to furnish the ovens with the necessary quantity of gas—at least with the existing plant. It was therefore necessary to use a higher grade of fuel—viz., coke of 25 to 45 mm.—with which it was possible to attain a capacity of about 18 tons of coke per 24 hours.

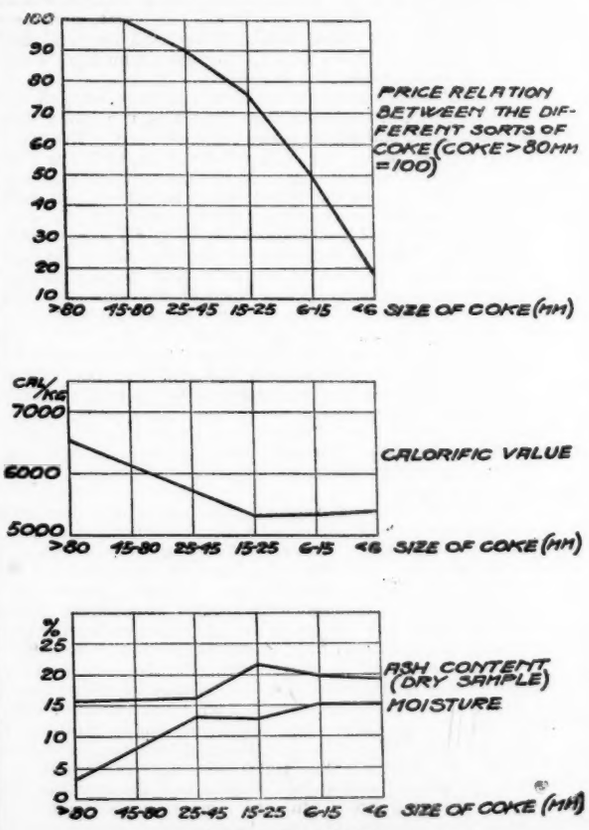


Fig. 1.—Coke Statistics.

This kind of coke is, however, of too high a grade to be used in producers, and is very easy to sell. As, on the other hand, the quantity of coke of 15 to 25 mm. is considerable, and is rather difficult to sell in Stockholm, it was proposed to alter the low-pressure producers so as to make them suitable for the latter.

Another disadvantage of these firebrick lined producer shafts is that the clinker will adhere to the walls, causing trouble at clinkering, and giving uneven gasification. This, together with the troubles mentioned before, was why it was decided to replace the lower part of the firebrick lined shaft by a 1800 mm. high water-jacket; and after this alteration, it was possible to use a coke of 15 to 25 mm. in the low-pressure type of producer, the capacity then being about 18 to 22 tons of coke per 24 hours for each producer, or more than the guarantee for the low-pressure producers as originally built, and with a coke of lower ash content.

THE PROBLEM SOLVED.

The working conditions of both high and low pressure producers have thus been improved in a high degree; but still better results could certainly have been attained had the water-jackets been a little higher. As a rule, the water-jacket must be at least as high as to reach that part of the producer shaft where the combustion of the coke is taking place. By the alterations indicated, the gas-works have been able to solve the problem of using the lower grade of coke themselves, and releasing the higher grade for sale —thus making a greater profit out of the coke. This may clearly be seen from the table showing the results of a series of analyses of ash and moisture made during March and April last year. The calorific value is calculated upon the assumption that that of coke free from ash and moisture is 8000 kg.-cal.

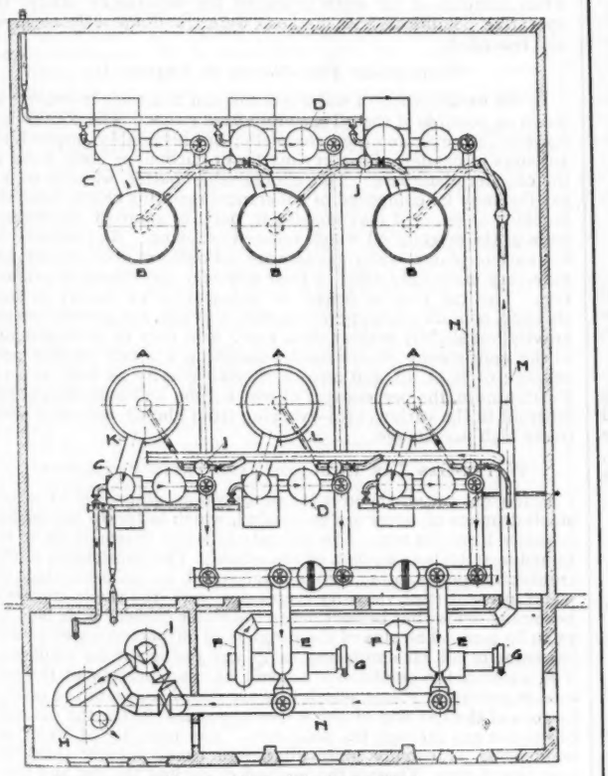


Fig. 2.—Plan of Producer Plant.

A High-Pressure Producer. B Low-Pressure Producer. C Vaporizer. D Scrubber. E Exhauster. F Blower. G Steam-Turbine. H Dust Catcher. I Water-Seal. J Regulator. K Gas-Outlet. L Air-Inlet. M Air-pipe. N Gas-Pipe.

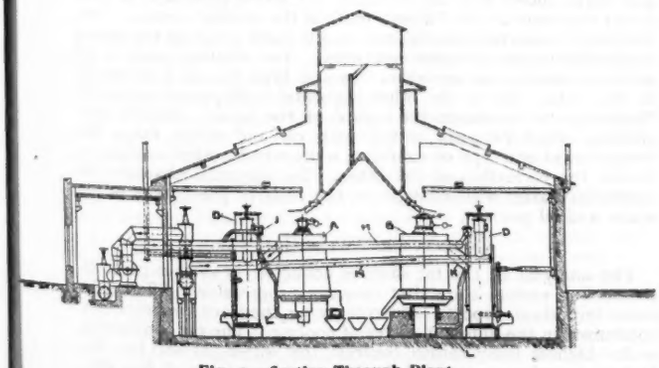


Fig. 3.—Section Through Plant.

A High-Pressure Producer. B Low-Pressure Producer. D Scrubber. J Regulator. K Gas-outlet. L Air-inlet. M Air-pipe. N Gas-pipe.

Size of the Coke.	Ash Content on Dry Sample.	Moisture.	Calculated Calorific Value.
Mm.	P.Ct.	P.Ct.	Kg.-Cal.
Above 80. . . .	15·7	3·1	6520
45 to 80	16 0	8·0	6130
25 ,, 45	16·1	13·4	5730
15 ,, 25	21 6	12·9	5340
6 ,, 15	19·9	15·1	5350
Under 6	19·1	15 1	5400

These figures are graphically shown in fig. 1, where also the existing price relation between the different sorts of coke is indicated. For the sizes of 6 to 15 mm. and under 6 mm., there are no real selling prices, as these sizes are no longer sold; but the relative prices are calculated from the price relation previously existing between the size of under 15 mm. and the other sizes.

COURSE OF THE PRODUCER GAS—SCRUBBER CORROSION.

A plan of this producer plant is shown in fig. 2; and fig. 3 is a corresponding section through the producer building. The gas after leaving the producer first passes through a tubular vaporizer, acting as a cooler for the gas, and at the same time generating the steam for the producer. The water for these vaporizers comes from the water-jackets of the producers, as already described. The gas enters these scrubbers near the bottom; and, in spite of a relatively thick plate (10 mm.), the part of the wall of the scrubber which is situated opposite the gas inlet used to show, in a rather short time, a great many corrosion holes.

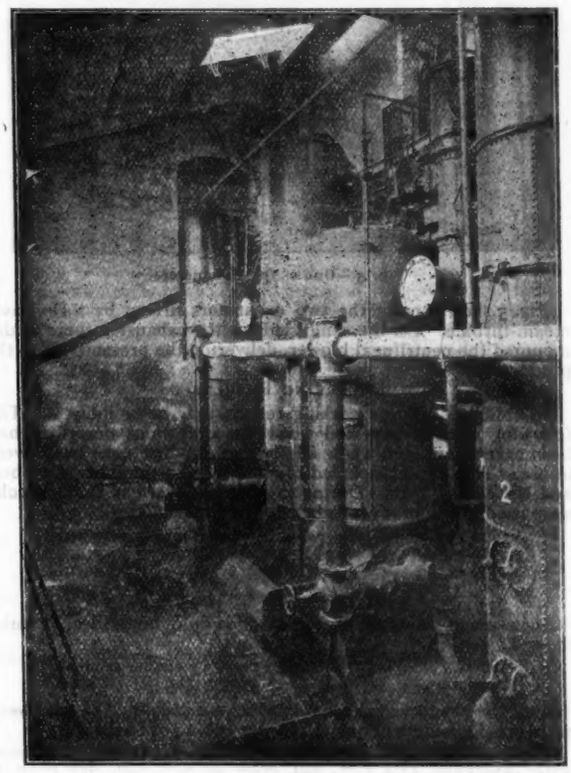


Fig. 4.—View of the Vaporizers and Washers.

The cause of these corrosions may be as follows. Through the same opening by which the gas enters the scrubber, the water used for washing the gas leaves it. As the two streams of gas and water meet, the gas will carry away water particles finely divided and mixed with coke dust; and thus this mixture of water particles and coke dust will produce a rubbing effect on the plate wall, resulting in corrosion holes. This corroding effect is naturally greatest on the wall opposite the inlet of the gas. Other parts of the scrubber will, however, also be affected by corrosion caused by the coke particles that are taken by the water entering the scrubber through the spray nozzle; but the effect will be less in the higher part of the scrubber, as the gas and water are cleaner here than in the lower part.

To avoid, or at least diminish, this corroding effect on the plate wall, a layer of a mixture of half sand and half cement is placed on the inner surface of the plate wall; the thickness of the layer being about 3 in. to a height of 3 ft. from the bottom, and thence diminishing to about 1 in. at a height of about 7 ft. from the bottom, from which part the layer continues to have the latter thickness all the way to the top of the scrubber. The cement is, of course, not resistant against the corrosion; but it is very easy to repair resulting defects, and the cost of such repairs will be less than if the corroded plates have to be substituted.

As, where the water is present, other parts also in the vicinity of the scrubber show such corrosions, it is probable that, on account

of sulphur dioxide dissolved in the washing water, a chemical action is exerted, such action naturally being greater where the gas has its highest temperature and a sufficient content of moisture. This would also explain the fact of no such corrosions having been observed in the vaporizers, where the gas has as high a content of dust, but where sufficient moisture is not present.

Dust Removal.

From the vaporizer the gas passes through a scrubber D, where the greatest part of the dust contained in the gas is removed by fine water sprays entering through nozzles spaced apart both circumferentially and axially. Fig. 4 is a photographic view of the vaporizers (the lower cylinders) and the washers. The gas from all the producers is collected in a main leading to the exhausters F, where water is introduced for further purifying the gas from dust; and when the producer gas has passed through the dust-catcher H, filled with bristle and the like, it is nearly free from dust. To obtain a producer gas as free as possible from dust is, of course, of the greatest value. The dust in the producer gas is liable to clog up the nozzles, and cover the walls of the combustion flues with a layer of bad heat-conducting properties.

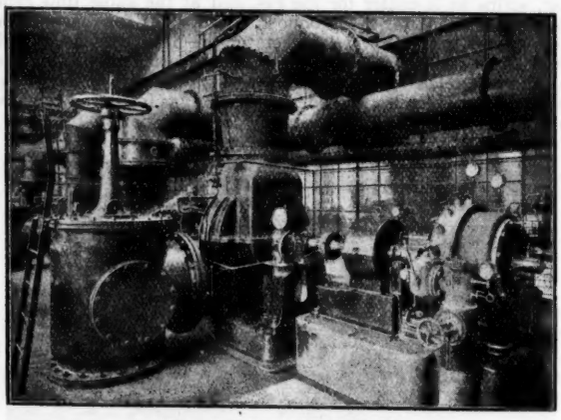


Fig. 5.—One of the Exhausters.

Fig. 5 shows one of the two exhausters driven by a De Laval steam-turbine. On the same shaft as the exhauster there is also mounted the centrifugal blower, delivering the pressure air to the producers.

Working Results.

In conclusion, some working results may be of interest. The following refer to a period when the alterations described had been carried out, and when all the bye-product coke-ovens were in use. This period included the months of September, October, and November, 1920. During this time the various kinds of coke were used in the producer plant to the following extent:

6 to 15 mm.	3045 tons	= 68·0 p.ct.
15 to 25 ,,	1283 ,,	= 28·6 ,,
25 to 45 ,,	152 ,,	= 3·4 ,,
Total	4480 tons	

An average analysis of these kinds and quantities of coke showed:

Ash	25·3 p.ct. (dry sample).
Moisture	14·3 p.ct.

With the producer gas from this coke, 25,699 tons of coal were carbonized, yielding about 14,476,000 cub.m. of coal gas.

The quantity of coke with the above-named content of ash and water averaged 17·4 p.ct. wet coke or 14·9 p.ct. dry coke in weight of the wet coal gasified. The quantity of coke free of water and ash amounted to 11·1 p.ct. calculated on wet coals.

Per ton of coke gasified there was used about 27 cub.m. of water for cooling and purifying purposes, divided thus:

Water-jacket and vaporizer	4·946 cub.m.
Scrubber	21·670 ,,
Exhauster	0·394 ,,

The gas leaving the producer plant contained on an average 0·165 gr. of dust per cub.m.

Midland District "B.C.G.A." Conference.—Alderman J. H. Lloyd, M.A., J.P. (the Chairman of the Birmingham Corporation Gas Committee), is to preside over the Midland District Conference of the British Commercial Gas Association, to be held in St. Mary's Hall, Coventry, on Thursday, April 27. In the morning, a welcome by the Mayor of Coventry (Councillor W. H. Grant, J.P.) will be followed by the opening address of the President, which will be replied to by Mr. W. M. Mason. A discussion on "Modern Gas Salesmanship—Development and Successes" will be opened by Mr. H. H. Creasey. At a public conference in the afternoon, two papers will be submitted—one on "Gas for Industrial Purposes," by Dr. C. M. Walter, of Birmingham; and the other on "Gas Equipment in relation to Modern Housing Schemes," by Mr. W. H. Becket, of London. In the evening Dr. C. W. Saleeby will lecture on "Life and Light." Lunch and tea will be provided by the Chairman and members of the Coventry Corporation Gas Department.

WATER-GAS TAR EMULSIONS.

By W. W. Odell, Gas Engineer to the United States Bureau of Mines.

[From the "American Gas Association Monthly."]

There are outlined below the essential facts brought out in an investigation into the causes for emulsion difficulties as experienced at many water-gas plants. The investigation was conducted under a co-operative agreement between the University of Illinois Engineering Experiment Station, the Illinois Estate Geological Survey, and the United States Bureau of Mines. Funds of the Illinois Gas Association were used to defray a part of the costs. Active assistance was rendered by the Peoples Gas Light and Coke Company of Chicago, who furnished a laboratory at Chicago for conducting the experiments, and loaned the services of Mr. E. A. Thiele to help with the laboratory work. A full report on the results of this work will be issued later; but it is thought desirable to bring the principal results now to the attention of the industry.

Scope and Purpose of Work.

In almost every gas plant where carburetted water gas is made, some difficulty is experienced, at one time or another, in separating the tar from the water condensing from the gas. The fact that the annoyance from this source is ever present in some plants, and seldom present in others, leads to the belief that certain operating variables had considerably to do with the formation of tar-water emulsions separable with difficulty. Accordingly, when samples of tar were collected for laboratory study, the operating conditions and methods were simultaneously observed and recorded.

Water-Gas Tar—What it Really Is.

In the carburetting of water gas the aim is always to convert as much as possible of the oil used into fixed gases. The conversion, however, is never 100 p.ct. complete; but invariably, appreciable amounts of condensable tarry matter or carbon, or both, form in the checker chambers. This condensable matter, which is water-gas tar, may be composed of substances resulting chiefly from the cracking of oil, or it may consist, in part, of some of the ingredients of the original oil which resisted cracking. As produced in the various plants, water-gas tars are not uniform in character, but may very materially differ in their physical and chemical properties. The tar may be brown in colour, thin or watery in consistency, contain a large percentage of light oils, and have a specific gravity but slightly greater than 1·00; or it may be a black liquid of the consistency of molasses, containing a much smaller percentage of light oil, and have a specific gravity as high as 1·15. Furthermore, the percentages of free carbon and naphthalene are different in the various tars—varying from almost zero to a relatively high percentage.

Water-Gas Tar Emulsions and their Formation.

Water-gas tar emulsion is tar produced as described, in which small droplets of water are suspended, which latter do not readily separate from the tar. The quantity of water that may be so retained is as high as 85 p.ct. of the whole. The consistency of the emulsion depends, other things being equal, on the percentage of water present (the viscosity increasing with the water content), becoming somewhat buttery when the water content is as high as 75 to 80 p.ct. The size of the droplets of dispersed water is not the same in all tar emulsions, or in any particular tar emulsion. The water of the emulsion is a result of condensation of the excess of generator steam which it is necessary to use in the manufacture of the gas and of the water vaporized during the passage of the hot gas through the wash-box. The quantity of water so condensing is usually more than four times greater than the quantity of tar. Though the method of cooling the gas and condensing the tar and water has considerable bearing on the formation of emulsions, it is not surprising that emulsions form. It is their permanency that calls for attention.

Analysis of tar samples collected at different drips of a given gas-works shows that the tendency for stable emulsions to form is not the same in the different units of the cooling system. This fact leads to certain conclusions, and is itself a clue to the causes for the formation of stable emulsions. Two distinct types of oil water emulsions are common. In one type the oil is dispersed in the water, and in the other the water is dispersed in the oil. Water-gas tar emulsions are typical of the latter. Certain substances, when properly mixed with oil and water, cause the formation of one type of emulsion, while certain other substances favour the formation of the other. The physical character of emulsions varies with changes in the relative percentage of the water and oil present.

Quality of Water-Gas Tar.

The analyses of the tar samples collected in various parts of the cooling system show that they are progressively different in some important aspects, accordingly as they are progressively condensed in the different stages of cooling. The tar condensing at the highest temperature (nearest the water-gas set) has the highest specific gravity and the largest percentages of free carbon residue upon distilling to 355° C., and paraffin hydro-carbons, and the lowest percentage of naphthalene solids. Further-

more, it is usually the tar which condenses in the early stage of cooling that forms the most obstinate (stable) emulsions.

There are a number of factors that have a pronounced influence on the quality of water-gas tar, some of which are:

1.—Temperature in the checker chambers.
2.—Checker-brick spacing.
3.—Rate of input of carburetting oil.
4.—Distribution of oil. (Efficiency of the oil spray nozzle.)
5.—Kind of oil used.
6.—Average condition of checker brick (frequency of re-checkering).
7.—Quantity of excess steam used.
8.—Character of condensing system, and rate of cooling gas.

Factors Affecting the Settling of and Formation of Tar Emulsions.

Upon considering the nature of water-gas tar emulsions, the question may arise: "Why is water always the inner phase, even when present to the extent of 60 to 70 p.ct. of the whole?" Also: "Do all such emulsions settle or separate at the same rate, and, if not, why not?" If these different effects are dependent wholly, or chiefly, on the varying composition of the tars, then the method for controlling the emulsion difficulties lies in controlling the factors affecting the quality of the tar in so far as this procedure is economical. If they are dependent on substances dissolved in the water of the emulsion, or on the size of the particles (droplets) of water, then the method of cooling the gas is of most importance. As a matter of fact, the tendency to form stable emulsions is affected both by the condensing and cooling methods and the quality of the tar itself. Water is invariably the inner phase in such emulsions, because of emulsifying agents present in the tar. The rate of separation is not the same in the different emulsions, but is dependent upon the temperature of the emulsion specific gravity and composition of the tar, soluble constituents in the water, size of the dispersed water droplets, and other variables.

In general, it may be said of emulsifying agents that those substances which are more easily wetted by water than by oil tend to cause the formation of emulsions in which water is the outer phase; while substances more readily wetted by oil favour the formation of emulsions wherein oil is the outer phase. Since tar is an emulsion of the latter type, it may be supposed that it contains such an emulsifying agent. It does; and the substance is the free carbon present in varying amounts in almost all tars. The fact that free carbon is present in greater percentages in coal tars (which do not readily form emulsions with water) than in water-gas tars does not apparently harmonize with this observation. Other factors must also be considered, to appreciate fully the significant part the free carbon actually plays. Experiments in preparing artificial tars (emulsions), using various oils with water, and employing carbon black in various proportions as the emulsifier, show that, with a given oil-water mixture, the addition of a very small percentage of carbon causes, upon agitation, the formation of a weak emulsion. Further increments in the quantity of carbon used, up to a certain point, increase the stability of the emulsion. Beyond this point, increments of carbon have the opposite effect. If carbon black is mixed with tar emulsion in proper proportions, the water is almost entirely liberated, and may be poured off as such. Seven per cent. of carbon is sufficient completely to free the water in the oil-water emulsions made. The concentration of the free carbon in tar is, therefore, of importance in the study of tar emulsion difficulties.

In emulsifying various mineral and tar oils, it was found that the paraffin oils lend themselves most readily to the formation of stable emulsions by the use of carbon. This is in accordance with the fact that, other things being the same, water-gas tars which on condensing form stable emulsions contain a higher percentage of paraffin oils than do those tars which are not so emulsified. This proved to be the case with the tars tested.

The factors affecting the completeness of oil cracking also influence the quality of tar produced and the tendency for emulsions to form. The proper control of these factors is one method for controlling the rate of separation of tar from the emulsions formed in the gas plant.

Summary and Conclusions.

Although the time allowed for the conducting of this investigation was limited to a few months, the writer feels that the conclusions arrived at, and which are in the main presented here in summarized form, are justified and true.

1.—With the present system for cooling carburetted water gas, and condensing the liquid products therefrom, it is natural that emulsions of some sort, either stable or weak emulsions, should be formed in the normal operation of a gas-works.

2.—The stability of the emulsions formed is increased as the completeness of oil cracking is decreased.

3.—The relative completeness of the cracking in different sets in a plant can be determined by testing the tars as indicated.

4.—The free carbon of the tar is the agent causing the production of emulsions in which water is the dispersed phase.

5.—The obstinacy or stability of the emulsions is not the same for all tars with a given percentage of free carbon. Expressed differently—the emulsifying effect of carbon is not the same for each of the oil constituents of water-gas tar.

6.—Other factors being practically the same, the tendency to form stable emulsions, due to the presence of a definite amount of carbon, is greater as the percentage of uncracked oil in the tar increases. By uncracked oil is meant the oil which appears as a clear oil residue on sulphonating the distillate oil from tar.

7.—In ordinary operation, the most stable emulsions are formed of those tars which contain the largest percentage of saturated oils. Thus the chemical composition of the tar has considerably to do with the rate of separation of the tar emulsions. A change of chemical properties is, of course, accompanied by a change in physical properties.

8.—Naphthalene, naphthalene compounds, and other unsaturated high boiling compounds of like nature obtained by the distillation of water-gas tar, are not so readily held in stable emulsions containing a high percentage of water, due to the presence of free carbon, as are the paraffin oils.

9.—In ordinary operation, the factors tending to increase the completeness of oil cracking also tend to increase the percentages of naphthalene, high-boiling tar oils and free carbon, and to raise the specific gravity of the tar, which change is accompanied by a decrease in the percentage of paraffin oils in it.

10.—The relation of specific gravity to the rate of separation or de-emulsification has been discussed. While it is true that tars with a specific gravity approximately 1·0 tend to form stable emulsions, it is evident that the specific gravity is merely an indication of a relatively high content of paraffins or of other chemical differences which favour the formation of obstinate emulsions, and is in itself not a primary contributing cause of emulsion difficulties.

11.—There is an optimum amount of carbon for the formation of stable emulsions containing a high percentage of water. The optimum percentage is not the same for all oils and tars.

12.—When carbon black, powdered coal, or the like is mixed with tar or tar oils and water, in greater quantities than the optimum amount, there is a distinct tendency for the agglomeration and separation of the dispersed phase (water). If such a material is added in large enough quantities, the separation of water is practically complete. In this instance, the tar and carbonaceous material exist as an amalgam in the form of a putty-like mass.

13.—The quantity of carbon or carbonaceous material necessary to expel completely the water depends primarily, but not entirely, on its fineness of division.

14.—The amalgam may be utilized as fuel by adding sufficient dry tar or other liquid fuel to give the desired fluidity.

15.—The factors affecting the production of, and rate of, settling of tar emulsions have been discussed—*i.e.*, viscosity, temperature, &c.

16.—The primary causes for incomplete cracking of oil in the production of carburetted water gas are apparently as follows:

(*a*) Low temperature in the checker chambers.
(*b*) Dirty checker brick (carboned brick).
(*c*) Insufficient time of contact of the oil vapours with the hot checker brick. This may be due to injecting the oil too rapidly, to the method of checkering, or to the particular style of set in use.
(*d*) Changing the kind and quality of oil used without altering other variables to suit the new condition.
(*e*) Unsuitable spray nozzle. One not adjusted to give the proper distribution of oil under prevailing conditions.

A rapid and inexpensive method for the determination of water in tar emulsions has been developed*.

* See 'Journal,' Vol. CLIV., p. 630.

Advertising and New-Business Development.

"There can be no sales policy in a company that fails to make an annual appropriation for advertising and new-business development. Such a company is without a policy. It is simply getting along—that is all." These were the concluding words of a paper on the need for advertising, presented at the Illinois Gas Association meeting by Mr. Charles W. Person, Secretary of the Advertising Section of the American Gas Association. Though the effective national advertising that the manufacturers are doing, and the newspaper space that is being used by those companies which have a strong aggressive sales policy backed by an equally aggressive advertising programme, show that advertising needs no defence, he says that, as merchandizers of gas service and gas-burning appliances, the gas industry is a greatly under-advertised one. The result is a vast unsold market. In the year 1920, for example, 140 company members of the American Gas Association, whose total gross sales of gas, exclusive of appliances, was $98,665,000, spent $843,120 for advertising, or 85 c. out of every $100. This is not so bad; but suppose they were sufficiently enlightened as an industry to spend $1 out of every $100 received. It would then be found that the 966 gas companies of the United States would appropriate $3,840,000 for advertising—"a sum that would put them on the advertising map in great big letters." With this outlay, backed-up by the national advertising of the manufacturers, a big dent could be made in the unsold market. "We shall," he went on, "never attain our real sales momentum until companies make a regular and definite appropriation for advertising. One per cent. of the total gross sales of gas is entirely reasonable. It may be figured out in other ways—the new-business department may take care of the appropriation. But no matter how it is arrived at, it should at least measure up to 1 p.ct. of the sales of gas—the ultimate commodity that it merchandized."

ECONOMIES IN STEAM-RAISING.

By T. W. Harper, of Ayr.

[A Paper read at the Spring Meeting at Kilmarnock of the North British Association of Gas Managers.]

The subject of steam production is a very wide one, and enters into nearly every kind of industry which our country produces; and with the short time at our disposal it will only be possible to touch the fringe of this important subject. The question arises, then, as to what are the chief causes of poor steam results obtained in our gas-works. As a fuel consumer, the steam generator takes second place to the carbonizing plant; and so long as there is a sufficient supply of steam delivered from the boiler to meet the works requirements, irrespective of fuel consumed and wasted, very little trouble is taken to improve matters until the steam supply fails. Then we are forced to realize the important position the steam generator occupies in gas-works.

Lancashire *versus* Water-Tube Boilers.

Of the many types of boilers now made, the Lancashire is more in general use in gas-works than any other type. There are many kinds of water-tube boilers working in a number of very large works, and these are generally taken to be of a higher efficiency and more rapid steamers; but, in my opinion, the first-named are the more suitable for average sized works, owing to their larger water capacity and as being more suitable for intermittent supervision. Also the Lancashire boiler is more accessible for cleaning purposes. In most water-tube boilers the number of tubes will be from 80 to over 100; and as these are provided with a pressure-tight cap at either end, they require to be taken off at least once in twelve months for examination and cleaning purposes. Where the feed-water contains a considerable amount of sediment, the bulk of this is found in the tubes in the form of scale, and requires to be scraped or bored out by means of air or water pressure or some other mechanical device.

The time taken thoroughly to clean a water-tube boiler and replace all caps will be anything from one week to a fortnight, and sometimes more, according to local conditions. Compare this with a Lancashire boiler, where there are only two manhole covers to be removed to allow ample room for cleaning and scaling, and the cost will be annually one-third of the cost for cleaning and scaling water-tube boilers. Then there is the question of tube replacements. In some localities where the feed water is exceptionally bad, replacement of tubes becomes a serious problem—although my own experience with water-tube boilers has been of the very best. During a period of ten years on a battery of four water-tube boilers—the quantity of fuel consumed being anything up to 200 tons per week—I did not have a single tube failure. This was due to the excellent practice of using town's water. For long life and reliability, however, the Lancashire boiler stands second to none; and this is equally true of the Cornish boiler.

Position and Setting of Boilers.

In the laying-down of boilers, the position and the setting are of the first importance. It has been the custom in some gas-works to fix the boiler at the end of the horizontal retort setting. While this position has been an ideal one for single boiler installations, where the chimney stalk serves a dual purpose for retort plant and steam generator, there have been faults in the design of the boiler setting owing to the narrow, confined space available for it, with the result that a section of the waste-gas travel has been left out, thereby reducing the heating surface of the boiler. This is a fault very often found in the setting of Cornish boilers, and in some of the smaller sized Lancashire type. The real cause of this has been the existing position of the retort waste-gas flue, with the result that there is an increased fuel consumption and a lowering of the boiler efficiency. There is only one correct form of boiler setting—that which gives the largest possible heating surface on the boiler shell.

The Question of Flues.

There is also another fault in standard boiler settings; and this applies to installations where only non-volatile or low-grade fuels are consumed, such as breeze and coke. It is usually found, unless otherwise specified, that the standard boiler setting is designed for the combustion of coal; and, of course, the width of the flues is sufficiently large to carry away the great volumes of smoky gases given off from a coal-fired furnace. With low-grade fuels, however, the same width of flues is not necessary, owing to the lesser volumes of gases given off from a breeze-fired furnace; and at the same time there is a much better heat contact with a narrower flue.

When using non-volatile fuels, it might be argued that the narrower flue would be a disadvantage owing to its more rapid filling-up with dust. While this is quite true, it would be in favour of the boiler in the end, as supervisors would be compelled to clean flues more often than otherwise. It must never be forgotten that the steam generators in our works are doing constant duty every day of the year, with an annual period of shut-down for cleaning and overhaul. This period of run is too long, and in most cases is responsible for increased fuel consumption and a lower boiler efficiency. It will pay to increase the periods for cleaning and overhaul from two to four per annum, for this will result in an all-round increased efficiency and a saving of fuel. This applies to the installations of one or two boilers; but with large installations, where a stand-by boiler exists and the consumption of fuel is heavy, it is necessary to take the boiler off for cleaning every six to eight weeks, more especially with water-tube boilers using low-grade fuels under forced draught.

There is another point in regard to the brickwork of boiler settings. This is the height of the brick wall at the back of the fire-grate, which has a controlling effect on the steaming properties of the boiler. The height of this wall will depend to a great extent on local conditions, such as chimney draught and the class of fuel employed. In using volatile fuels, the height is usually 9 in. from the crown of the furnace tube, and more or less according to the size of the furnace. In any case, the gas space above the back bridge should not be less than one-eighth of the fire-grate area. But the position is somewhat different when using low-grade fuels and forced draught. It will be found that by increasing the height of the back bridge by even one course of bricks there will be beneficial results, more particularly in the case of forced draught. But it has to be remembered that the back bridge must not be raised to a height which will cause throttling of the hot gases when the furnace is working at its maximum—otherwise there will be serious effects to the tube plates above the fire-grate and the fire-doors, due to overheating.

Feed Water and Scale.

The next point which has a bearing on steam raising is the nature of the feed water used. It is the desire of all engineers to obtain a supply of water at the lowest possible cost, by the simple process of pumping from a river, burn, or sunk well. As a rule, water of this kind contains a large amount of solid matter, which is deposited when the water is evaporated under pressure. Present-day practice tends to higher working pressure, which means increased temperature. It goes without saying that our trouble with boiler scale is increased rather than diminished. Experience proves that, with increased pressure and higher temperatures in our boilers, the scale will be harder and more difficult to remove; so that there is nothing that will increase fuel consumption more than dirty and impure water. The impurities most commonly found in feed water are carbonates of lime, sulphate of lime, and magnesia; and the quantity of these impurities will vary more or less according to the locality and the source from which the water is drawn. It is well to remember that the evaporation of water per pound of fuel will be reduced to the extent of 10 p.ct. for each $\frac{1}{16}$ in. thickness of scale. This also will vary according to the nature of the scale.

There are various ways of removing scale, some crude, some bad, and some indifferent; but the most crude of all I consider is by the chipping hammer. There is nothing more harmful to boiler plates, to my mind, than to remove scale in this manner; for it will be found, in nine cases out of ten, that the surface of the plate has been broken and ragged. This only aggravates the trouble and paves the way for further scale deposits, which is again more difficult to remove. To keep boilers free from scale is a difficult problem at all times, and many works are unfortunately placed in regard to a sufficient supply of feed water which is satisfactory or safe to use in its natural state. Of course, there is always the town's water; but in many cases objection is raised to the use of this on account of cost, which is considered prohibitive. In the end, however, it is always safest to use, if possible, water obtained from the domestic supply.

There are a number of different types of apparatus designed for the purification of feed water before it enters the boiler, and there are also any number of solvents for softening the scale after it has been precipitated in the boiler and has adhered to the plates, enabling it to some extent to be blown-out by the use of a blow-down valve. Some of these solvents are good, but a number of them are bad and dangerous to use; and it is always necessary to make a reliable investigation into the chemical composition which is to be used as a scale remover inside the boiler. A decision as to the best cure to be adopted is not easily obtained, as the deposit precipitated from water under high pressure and high temperature is chemically different from that precipitated at a lower temperature and pressure.

In large steam installations, a water softening plant will prove a decided advantage and a means of economy. After an investigation has been made into the nature of the water, and the trouble has been found due to temporary hardness as from carbonate of lime and other soft deposits, the softening of the water can be done in a simple and effective manner, leaving the precipitate outside the boiler—having due regard to the cost of the plant employed. In some cases an old boiler shell will be all that is required for a filtration tank, provided a constant and sufficient quantity of soda ash or common washing soda is added to the water before it is evaporated in the boiler. But when the water contains sulphates which produce permanent hardness, then it can only be softened by a suitable chemical agent applied accordingly. There also enters the further and important factor of the corrosive properties in water and how they may be counteracted. It has first to be learned whether the corrosion is due to salt water, or whether it is caused by corrosive gases, such as carbonic acid, or by free oxygen in the form of air in the feed water. The trouble may be produced in a simple way, such as by a feed pump too large for its work, or from an empty feed tank, or may be from a surface condenser in bad condition and drawing air.

In any case no great expense should be incurred in the treatment of feed water until it has been investigated by a competent authority. It is only fair to say at this stage that good solvents

have failed by being wrongly applied. It is no use to apply a large quantity at long intervals—it is a much better way to apply the solvent in small quantities at more frequent intervals, according to the condition of the feed water. So long as there is water being evaporated, there should be chemical action in the boiler to counteract any deposits thrown down; and in this way success can be obtained where there has often been failure, provided that the boiler is blown down frequently in order to remove all deposit lying in a soft state. It is important that this should not be omitted.

The Fuel and the Grate.

We come now to the consumption of fuel in the boiler furnace. This may be done by natural draught, forced draught, and induced draught. The types of grates now used are many and varied, and all have their own particular advantage. For ordinary practice, however, such as is carried out in our undertaking, a straight-bar grate is the most common; the only difference in ours being that the air spacing is more finely divided up, which is more suitable for small and low-grade fuels. A question might be asked as to the correct quantity of fuel that should be burned to give the best possible results per square foot of grate area. This will depend on the class of fuel used and the conditions under which it is consumed. With good coal, during trial runs lasting from six to twelve hours, it has been possible to burn to complete combustion 18 to 23 lbs. per square foot of grate surface, with a natural draught not exceeding 4-10ths pull at the chimney.

While the above figure can be obtained during the period of steaming test, when the supervision is of a very high order and the boiler working under the very best conditions, it does not mean that these conditions will continue. As a matter of fact, to expect them is asking for the impossible, because it is at this point of steam production where the human element comes in on hand-fired boilers. A good fireman can only stoke a certain amount of fuel and do it well, having due regard to the results expected. There is the further point that for every 100 lbs. of fuel put in the furnace he requires to take out 15 to 20 lbs. in the form of ash in a hot condition; so that to overstep the maximum in this respect only leads to increased fuel consumption and reduced boiler efficiency.

In regard to the stoking of hand-fired boilers, good results depend to a great extent upon the individual. It is quite common, where boilers are working twenty-four hours a day, to find that the steam produced and fuel consumed vary considerably per man. One man will work honestly hard with only moderate results; while his mate who follows will produce the same steam and pressure with a much less fuel consumption and with less labour, but with more skilled effect—that is to say, he studies his work from a more technical standpoint in controlling his dampers and the state of his fire to obtain good results. So that it occurs to me there is some need in the way of improving the ability of the individual fireman by means of education in the proper method of firing boilers.

The fuel with which we are more concerned is that which we produce in the form of residual coke and breeze. It is generally conceded that breeze can only be burned economically under forced-draught conditions; but it can also be consumed under natural-draught conditions. I have done it myself in a Cornish boiler—the chimney draught being as much as 6-10ths; the results obtained being quite favourable. The only drawback was that the capacity of the boiler was too small for the work it was called upon to do.

Of the two methods of artificial draught, the induced system is more economical in steam consumption. It is also subject to more sensitive regulation; but the wear and tear on the fire-bars is greater, and the capital cost is higher, than with forced draught. The advantage of the forced system is that the furnace is always supplied with warm, moist air, and the life of the fire-bars is thereby of longer duration; but the steam consumption is always higher than the figure stipulated.

Makers of steam-jet blowers state this figure for steam consumption to be not more than 2 p.ct. of the boiler capacity. While this figure may be correct when the steam-jets are new, it will only be for a short period, more especially when the blowers are supplied with superheated steam. I have found the bore of steam-jets increased in size, by the cutting action of superheated steam, to such an extent that the consumption of steam rose from 3 to 5 p.ct. of the boiler capacity, while the actual evaporative capacity of the boiler, which had been increased by the adoption of forced draught, had been reduced to the extent of the increased consumption on the blowers. This will amount to a considerable figure on the total amount of steam delivered from a battery of (say) four water-tube boilers. It is therefore a wise plan to keep a spare set of steam nipples in stock, so that they can be fitted when necessary.

It is assumed that a much larger amount of low-grade fuel can be burned per square foot of grate surface with either forced or induced draught than with natural draught. While this is quite true, there is a point to which the rate of combustion can be increased, but beyond which it is not advisable to go, because it will only lead to a complicated, and even a dangerous, set of conditions. When using forced draught to increase the rate of combustion, it is necessary to increase the air pressure on the bottom of the fire-grate; and it has to be remembered that when using such fuels as breeze and small coke, its weight is very light in proportion to its volume, with the result that a considerable portion of semi-burnt fuel is carried over into the flues to lie in a state of slow combustion. There is also a large volume of unburnt gas sent over from the fire; and this is where the serious state of conditions comes in. It is common in the case of excessive rate of combustion for the brickwork to be in a state of high temperature; and should there be air leaks then, the probability is that there will be formed an explosive mixture, which might cause serious damage. I have seen this happen, and know to what extent damage can be done under these conditions.

Here is another example of excessive rate of fuel consumption. During a period of my experience with a battery of four water-tube boilers, it was the custom to tabulate the weight of fuel consumed and water evaporated each week, and the analysis of the flue gases was also taken. During the period of normal conditions the average evaporation would be from 6 to 7½ lbs. of water per pound of fuel consumed, with feed-water temperature at 210°; and an examination of the flue gases would show a high content of CO_2 and N and the percentage of CO and free oxygen correspondingly low, which went to prove that a good state of combustion had been obtained. When, however, a heavy demand was put upon the installation and the rate of fuel consumption increased, the figure for evaporation went down; and the analysis of the flue gases would show an increase in the content of CO and O, and naturally the percentage content of CO_2 and N were much lower, which proved that the maximum rate of combustion had been exceeded. In my opinion, a figure of 22 to 28 lbs. of breeze consumed per square foot of grate area should not be exceeded if good results are to be obtained. I am well aware that a higher figure can be obtained; but this is in very large boilers, and the advantage to be gained is questionable.

Utilization of Waste Heat.

In regard to the employment of waste heat as a means of reducing fuel cost, there is always abundance of exhaust steam going to waste in our works; and this can be used up in a very effective manner by heating the boiler feed water in a feed-water heater. This is where the electric power engineer comes out strong. Every available unit of waste heat is taken advantage of to increase the efficiency of the steam-generator. If it takes one heat unit to increase the temperature of 1 lb. of pure water 1° Fahr., and as the temperature of exhaust steam will be something over 212° at atmospheric pressure, it is quite safe to assume that 150° of this heat can be transmitted to the feed water during its passage through the heater to the boiler; and in this way a saving to the extent of at least 10 p.ct. can be effected. There are a number of efficient feed-water heaters on the market, the capital cost of which is small compared with the savings in fuel consumption; so that it will pay even the smallest works to adopt this means of fuel economy. There is the further advantage that there is less unequal temperature in the boiler. All that is required is to concentrate all exhaust steam, by means of a well-covered pipe-line, to a point near the boiler.

In large steam installations where the boilers exceed two or three in number, it is usual to lay down a fuel economizer to heat the feed water from the waste gas on its way to the chimney; but this is doubtful economy. Bearing in mind the fairly high capital cost of the economizer and the necessary building work, the trouble in keeping it free from scale, and the temperature of the waste gas obtainable when using low-grade smokeless fuel, it will be found on investigation that the temperature of the waste gas will not exceed on an average 500° Fahr. in the main flue. One can realize that with fuel such as breeze or even small coke, most of the heat will be transmitted through the furnace tube plates, *plus* a short distance in the bottom flame bed. When using Lancashire boilers, or with water-tube boilers, the same effect will take place on the first few bottom rows of tubes.

I have found when working an economizer under the above conditions, in combination with an exhaust steam heater, that the figures for temperature were, on an average: Heater inlet 56°, heater outlet 190°, and economizer feed outlet 220°. So that the capital gain in temperature from the economizer was only the small figure of 30°. However, it can readily be realized that with the economizer, when working by itself without the heater, the gain in temperature would be more than the figure of 30° stated, because the heat in the waste gas would be more used up in contact with the surface of the colder economizer tubes. Of course, with high volatile fuels, the economizer is a distinct advantage, because the temperature of the waste gases is much higher and the flame travel much longer; so that the saving under these conditions will be in the region of 20 p.ct., with a falling-off between periodical cleanings.

Superheaters.

One of the most important steps taken in recent times to effect economy in steam production is the introduction of superheaters. While there is nothing new in the application of this important addition to the boiler, engineers in the past have been slow to adopt them. I think this has been due to a want of faith in the material used in their construction, and to lubrication troubles experienced in the engine cylinders; but there need be no such fear to-day, as there are records which give the life of the superheater to be of a duration as long as the life of the boiler to which it is connected, and owing to the improved qualities of cylinder oils for higher steam temperature. The correct position for maximum superheating is in the down-take flue at the back of a Lancashire boiler, or, with water-tube boilers, immediately on the top of the tubes. The advantage to be gained then is: Suppose we take the steam pressure to be 100 lbs. per square inch, the temperature

will be 328° Fahr., and to this the superheater will give (say) 200°; making the total temperature 528° at the same pressure. The volume of 1 lb. of saturated steam at 100 lb. pressure will be 4·34 c.ft., and at 528° superheated will be 5·43 c.ft.; so that the actual increase in volume will be about 25 p.ct. at the same pressure, and a perfectly dry steam obtained. There is a further advantage. Any water thrown over from the boiler from any cause, such as priming or sudden rush of steam, will be taken up by the superheater and evaporated. In my opinion, superheaters should be universally adopted on all steam generators; and the capital cost of these will be a safe investment.

Steam Distribution.

With reference to the distribution of steam, it is very often found that, after having tuned-up our boiler plant to give the best possible results, the fuel bill is still too high; and in looking round we will find a considerable amount of loss taking place in the main steam-pipe lines and service pipes. It is well known to all of us that a gas-works does not lend itself to the best system of steam distribution. The pipes are laid at all sorts of levels, heights, and under the ground, and the nature of the work which we carry on makes it impossible to obtain an ideal steam distribution. It is generally assumed that main steam-pipes should be laid with a fall towards the boiler, to drain back any water that is thrown over. While there may be sound reason in this, especially where the work is intermittent—that is to say, in works where there is only day duty to be done—it is quite different in a works where the consumption of steam is in constant demand the whole twenty-four hours of the day; so that instead of the small trickle of water that is lying in the bottom of the pipe running back to the boiler, it will be carried forward with the high velocity of the steam, which may be as much as, or over, 60 ft. per second.

Another factor which contributes to the loss of steam is the long distance it has to be conveyed, and in many cases bad and broken lagging, which exposes the bare pipe to extreme radiation and results in heavy condensation. As an illustration of the loss due to radiation from bare pipes, it has been found that, when freely exposed to the atmosphere, the loss by radiation is equivalent to the condensation of almost 1 lb. of steam per square foot of bare pipe surface per hour; and when steam-pipes are in constant use, the loss under this head is very serious.

In good practice, main steam-pipes should if possible be laid at a height a few feet above the boiler stop-valve, and with a fall of about 1 in. in 50 ft. in the direction of the steam flow; and where it is required to change the direction, this should be done with easy bends. If the level has to be lowered at any point, this should be done in vertical formation, and an efficient steam trap fitted at the lowest point. Preferably the trap should be of the automatic type, to ensure constant and efficient drainage. The float type of trap will give a good account of itself provided it is kept in good condition. Wherever possible, steam-pipes should not be put underground, if for no other reason than that they are difficult to drain. I know that some engineers prefer to have them underground than straggling in mid-air throughout the works; but if the pipes are properly slung and supported with an even run, there is nothing unsightly about them. Where it is necessary for steam lines to be laid underground, then these should be accommodated in a well-built track, properly drained and free from water; care being taken to fit traps at convenient points to carry off condensation. The best lagging should be used, and the track should also be covered with cast-iron plates to allow easy access at any point.

In regard to long-distance transmission of steam, superheated steam will be a distinct advantage, because, owing to the higher temperature, it will compensate for the loss in temperature due to radiation. In transmission the radiation losses on well-lagged pipe-lines is taken at 1° Fahr. per yard run, so that, even with the small loss in temperature, the steam will be in better condition for use at its ultimate destination than if leaving the boiler in a saturated condition.

These, then, are some of the important points which I think contribute towards increased fuel costs. There are, besides, small leakages which have the same effect, all of which require attention at the first sign of steam waste. If we spare some of that energy on our steam generators which we concentrate on our carbonizing plant, it will be found that the cost for steam generation will be reduced to a much more appreciable figure.

[The discussion on this paper was postponed to a subsequent meeting, and will be noticed in due course.]

HOME SUPPLIES OF FUEL OIL.

At a meeting on the 7th inst. of the Manchester Section of the Society of Chemical Industry, Prof. J. S. S. Brame, F.I.C., President of the Institution of Petroleum Technologists, read a paper on "The Possible Economic Development of Home Supplies of Fuel Oil," in the course of which, dealing with the necessity for this country to take into serious consideration the possibility of the development of the home supply of fuel oil, he reviewed at some length the published proceedings and findings of the Crewe Committee and the Department of Petroleum Research.

He pointed out that, in view of the large power stations which it was proposed should be installed throughout the country in the immediate future, the question of the utilization of retorted residues for power production became of increased importance. The world's demand for fuel oil had gone up by leaps and bounds in the past five years. A drawback in the case of oils obtained by low-temperature distillation was that they were somewhat rich in tar acids, thus detracting considerably from their calorific value. It would not pay to separate out tar acids. Another point was that the oils became a butter-like mass, owing to the presence of wax. They therefore required cracking.

Dealing with low-temperature carbonization of coal, Prof. Brame referred to the report of the Nitrogen Products Committee issued in 1918, remarking that the Committee stated that there was no commercial practice in this country upon which definite reliable data could be formulated as to costs and average yields, though they published some extremely valuable information relating to low-temperature carbonization with subsequent gasification of coke. The figures given, however, must be accepted with a certain amount of reserve, as the results indicated were those of only two systems—the "Tozer" and the "Chiswick."

Though there was probably very little torbanite in this country, yet it contained material which was very rich in oil. Bastard cannels were usually high in ash content; but they were undoubtedly retortable material. Mr. Dunningham Craig considered that there were very few of the remaining cannels which would yield 50 gallons of oil to the ton; but many of them would yield 40 gallons. The worst of the bastard cannels would yield something between 20 and 25 gallons; and whether it would pay to retort them depended largely upon the utilization of the gas which might be obtained from the carbonaceous material left in the residue. A considerable quantity of sulphate of ammonia could be obtained by means of low-temperature carbonization; but, of course, the bulk of the nitrogen remained in the carbonized residue, and a substantial revenue might be derived from subsequent gasification.

A FREE SWINGING INCANDESCENT FITTING.

A very pleasing series of gas-fittings is about to be put on the market by the patentee and manufacturer, Mr. H. C. Pride, of No. 4, Ramillies Place, Oxford Street, W., whose invention has for its objects the entire concealment of the gas-connection from the ceiling-rose; to allow a free swinging movement of the fitting; and to obviate strain to the tubes when cleaning the bowl or burner. It will be seen from the illustration that the bowl beneath completely conceals the inverted burner, which may be of different patterns; but in the fitting inspected was a Bray horizontal twin superheater burner made to Mr. Pride's specification. The fittings will be made for one, three, or five lights, and with three, four, or five suspending tubes; and according to the size, the gas will pass down one or more of the ball-jointed rods. The free swinging movement which these joints permit takes any vibration of the mantle. When once the burner is adjusted and the mantle fixed, the light can be operated by chains or switch with the aid of the bye-pass. When detached from the bottom ring, the suspending tubes naturally fall together, which simplifies packing.

The semi-indirect lighting result is excellent; and the highly decorative effect, with striking neatness of appearance, of the "Pride" patent gas-fitting should find favour with consumers.

Gas Industry in the United States.

Lecturing before the students of Brown University, Mr. F. C. Freeman, of Providence (a member of the Committee of the American Gas Institute on Co-operation with Educational Institutions), asked why it is there is so little knowledge of the gas industry among the people. Most of them, he said, have just a hazy idea that gas is made from coal. The main reason is that the gas industry has gone along and "sawed wood" without talking about it; while another reason is that gas cannot be seen as a physical object. There is no starting-point from which to build-up knowledge, unless people are interested enough to go out and inform themselves. Therefore it is felt that gas is mysterious. Yet the gas industry in the United States is one of the biggest collective efforts of service for man that is to be found in the world. Some 80,000 men, in addition to miners, transport workers, and those for materials behind the business, are directly engaged in gas production and distribution. There are over 1000 plants in the country serving 4500 cities. To produce the annual amount of gas supplied requires 10 million tons of coal and 900 million gallons of oil; and it is conducted through main street pipes which would stretch round the world three times.

HELPING THE HOUSEWIVES.

Glasgow Gas Department Schemes.

"A live and progressive department." This was a remark overheard beside the stand of the Corporation Gas Department, not once, but many times, before the closing of the Bakers', Grocers', Confectioners', and Allied Trades Exhibition which has just been held in Glasgow. The stand was the last expression of their progressiveness, not merely in itself, but in the enterprise and the educational value which it represented.

The exhibition was held in the Kelvin Hall; and the hall is the property of the Corporation, having been built for the purpose of holding exhibitions organized by the Corporation. Naturally, then, a department of the Municipality that is alert and up-to-date would, on the suitable occasion of a big show in the Kelvin Hall, take the opportunity afforded of displaying its wares and advertising its efficiency. On previous occasions, there have been various interesting displays by the department, showing the possibilities of lighting and heating, and demonstrating the beauty, the convenience, the cleanliness, and the hygienic advantages of gas-fires. Charmingly appointed living and bed rooms with gas installations and bathrooms and sculleries fitted with geysers and other gas-heating appliances have shown to all but the most prejudiced that gas is a modern wizard, and that it lightens to an incredible degree the domestic work of the home.

On the present occasion, the Gas Department (at the head of which is Mr. J. W. M'Lusky, A.M.I.M.E.) realized that a bakers' and grocers' exhibition was certain to attract housewives by the hundred. Hence the happy idea that the Corporation should provide a direct attraction for these ladies on lines that were altogether novel, and at the same time entertaining and instructive. Before the exhibition, publicity was given to the scheme; and the arrangements were carried out "according to plan" with the most complete success.

There are in the city 150,000 housewives who cook their family food either completely with or by the assistance of gas. Some of these are excellent manipulators of the gas-cooker; some are uncertain; others are bunglers; and the last two classes are apt to be critical of their stoves, and even to abuse them. Anxious to show that the matters complained of were practically always the fault of the cook, and not of the cooker, the Corporation Gas Department decided to show what could be done by the woman who had learned how to manage her appliances, and also to demonstrate at the stand what could be achieved by any competent cook; while at the same time experts at the stall were ready to answer any questions and to remove any difficulties. It was made plain that no woman in the City of Glasgow need have any gas difficulties, if only she would take the trouble to confide them to the proper department.

Prior to the exhibition, a competition was inaugurated. For convenience of judging, only two classes were invited to enter—madeira cakes and fruit cakes. The following were the conditions of the competition:

1.—The cake or cakes must have been baked at home in an ordinary domestic gas-cooker.

2.—Persons engaged in baking goods for sale were not eligible.

3.—The competition was limited to users of gas supplied by the Glasgow Corporation Gas Department.

4.—The decision of the judges was final.

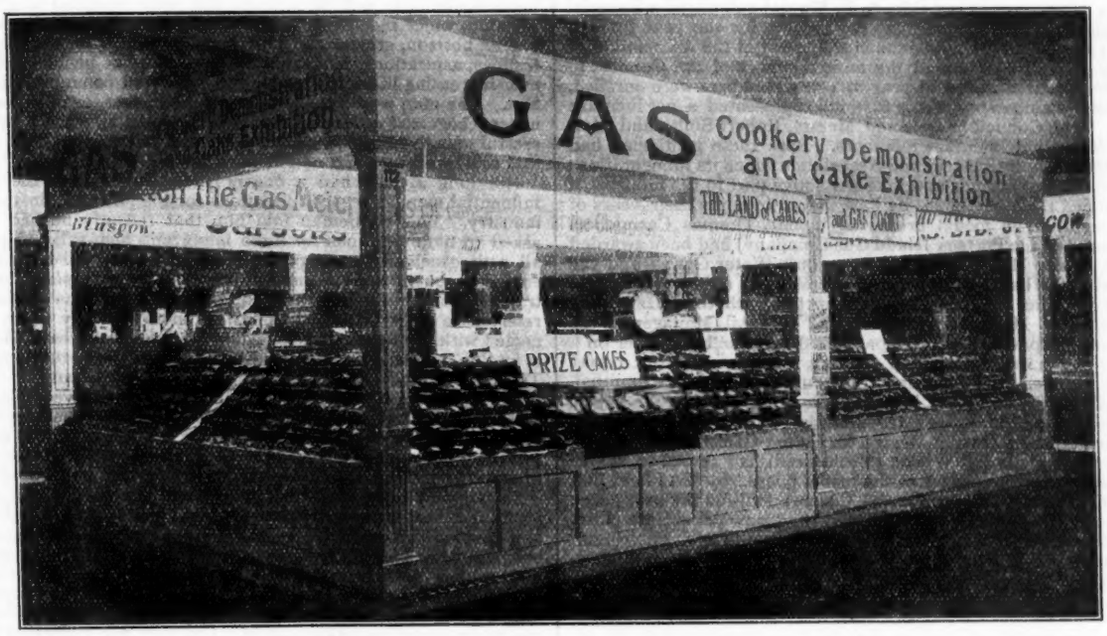
5.—The cake must weigh about 1 lb. Cost to be declared, and must not exceed 1s. 9d. Points would be given more for lightness, texture, and perfect baking, rather than richness of ingredients.

6.—The cakes would become the property of the Gas Department, and would be sold at the close of the exhibition in aid of the Benevolent Fund of the Scottish Bakers.

7.—No charge for entry to competition.

8.—Cakes, together with entry forms, had to be delivered at any of the Gas Department showrooms on Friday, March 24, from 9 a.m. to 6 p.m.

In response, there were 750 entries—a magnificent number when one considers the novelty of the scheme, and (if one may say so) the shyness of Scottish housewives. Their dislike of publicity was, however, avoided by the fact that the cakes were numbered, and that no names except those of the prize winners appeared. The cakes, beautifully coloured and shaped, made a fine display; and there was a considerable demand for them when they were put up for sale. The stand at which they were shown was specially constructed for their display and for demonstration purposes. On all four sides was a triple row of staging raised to a convenient level; and the numbered cakes were ranged all round upon these shelves. The centre of the stand was a raised platform, which made a temporary demonstration kitchen. Cookers were installed with a sink and water-heating apparatus. Attention was called to a meter showing the quantity of gas consumed and the cheapness of the method, while, elsewhere, the effect of the governor was demonstrated, and its functions as a gas economizer brought before the public. Invitations were given to the housewives to mention their difficulties to the experts in attendance; and Miss Bryan and Miss Darling and their assistants readily answered all questions as to firing, regulating, and making the best use of the gas-cooker. Specimen dinners were cooked; and bread, pastry, and cakes were baked.



THE GLASGOW CORPORATION GAS DEPARTMENT'S STAND, LIGHTED BY SUGG'S EIGHT-BURNER "LITTLETON" LAMPS.

On Thursday afternoon, April 6, there was a pleasant little function, between the band performances. Councillor Thos. Young (the Convener of the Gas Committee) presided; and the Lord Provost (Mr. Thomas Paxton) presented the prizes to the ladies who were successful in the competitions. His Lordship emphasized the advantages of gas heating and cooking, as he knew them from experience. The matter was, he said, one that was very near his heart and those of his colleagues, for the burning of gaseous fuel had behind it the greater question of the purification of the air. He wanted the public to realize that the more gas they burned the cheaper it would become; and perhaps some day they would get back to the pre-war 1s. 11d. per 1000 c.ft. Councillor Shinwell (the Convener of the Sub-Committee on Gas Distribution) and Councillor Renfrew (the Vice-Convener of the Committee on Gas Supply) also spoke. Afterwards tea was served.

Among the many interesting features of the competition was the presentation to each winner of a portrait of herself taken beside her cooker. It was characteristic of the pictures that the stove shone even in the picture, and was kept with the most meticulous care. And when you think of the difference there is in cleaning-up a range and rubbing-down a gas-stove, you really wonder

how either housemistress or maid has put-up so long with her fireside worries!

This is probably the first time that such a competition or such a stand, purely for the education of the housewife, and not merely for purposes of display, has ever been arranged. The Glasgow Corporation Gas Department are exceptionally keen on their "Help the Housewife Scheme." At present their talented demonstrators, who are deft on the practical side and really interesting lecturers, are going round the districts giving lectures on the right management of the gas-cooker. They are also prepared to visit any house and to show the right way to use the cooker. The success of the present venture prompts the suggestion that it might be a great scheme if, following on these visits and lectures, the Department were to inaugurate district cookery competitions which would promote a spirit of friendly emulation among the ladies.

SCOTTISH JUNIOR GAS ASSOCIATION.

Annual Meeting of the Western District Section.

The Annual General Meeting of the Western District of the Scottish Junior Gas Association was held in the Royal Technical College, Glasgow, on Saturday afternoon, the 8th inst.—Mr. James Cubie (the President), in the chair.

The Report.

The Hon. Secretary (Mr. A. B. Munro) submitted a financial statement, which showed that the income for the year totalled £133; and there was a balance at the credit of the Association of nearly £47. He also read the annual report of the Council, to the effect that during the year 104 new members were enrolled. The total membership was 306, which represented a net increase of 83. The Council had elected Messrs. Robert Smith and Malcolm M'Donald honorary members. Both these gentlemen had maintained an interest in the Association since its inauguration; and while they did not now take any active part in the industry, it was hoped that they might be long spared to enjoy their years of retirement. The medal presented by Mr. Thomas Carmichael (Engineer of the Portsea Island Gas Company) had been awarded to Mr. James M'Nicol for his paper on "Water Gas;" and the second prize had gone to Mr. John M'Isaac (Glasgow), for his paper on "Gas Furnaces." In connection with the prize offered by Mr. J. W. M'Lusky (Engineer and General Manager to the Glasgow Corporation Gas Department) for the best paper on a survey of the work of session 1920-21, it was a matter of regret to the Council that only one contribution had been submitted. Mr. Walter M. Paterson, however, who had sent in the paper, was to be presented by Mr. M'Lusky with a copy of Hole's "Distribution of Gas." Messrs. D. Fulton (Helensburgh), J. W. Napier (Alloa), and J. Wilson (Motherwell) had agreed to act as adjudicators in the matter of the medal offered by Mr. James Bell (Gas Engineer to the Dumbarton Corporation) for the best paper read in the course of the session that had now drawn to a close. The report concluded with congratulations to Mr. Peter Sim, who had been promoted to the post of Gas Manager at Buckie, and to Mr. J. Beveridge, on his appointment to Pontefract.

New Officers.

The President announced that the Vice-President (Mr. W. M. Lennox, of Falkirk) would now automatically become President for next session.

Thereafter Mr. A. Walker (Kilbarchan) was unanimously appointed Vice-President; while the election of Mr. Alex. B. Munro (Gas Department, Milan Street, Glasgow) as Hon. Secretary was also carried. For five vacancies on the Council, the following were successful in the ballot: Messrs. A. Sinclair (Greenock), J. M'Isaac (Glasgow), W. Scott (Tradeston), W. M. Paterson (Glasgow), and A. Gray. The Auditors appointed were Messrs. Graham (Greenock) and Wyllie (Glasgow).

The "Second Mile" in Salesmanship.

The President said the members were to be favoured with an address from Mr. W. M. Mason, the Manager of the British Commercial Gas Association. Mr. Mason, he might explain, was no stranger to them, because it was interesting to recall the fact that he was the first Secretary of the Western District Branch of the Scottish Junior Gas Association. Those who were members eighteen years ago—the period to which he was referring—would remember the spade work that Mr. Mason did in the formation and development of the Western District Section. To-day the Association was reaping the benefit of the earnest work that was performed by their friend Mr. Mason. When the "B.C.G.A." was organized, the members of the Western District of the Scottish Junior Association were delighted to find that he was made the first Secretary; and it was in great measure due to his enthusiasm, energy, and ability that the "B.C.G.A." had become such a valuable encyclopædia and propagandist on behalf of the gas industry. It was a further compliment to Mr. Mason that last year the Association should have promoted him to the management. The members appreciated very highly his visit to Scotland on this occasion; and as a mark of their esteem, the Council had unanimously agreed to elect him an honorary member. It was a fitting acknowledgment of all their friend's kindness to the Juniors on that side of the Border.

Mr. W. M. Mason (who had a most cordial reception) said it was with particular pleasure he came to Scotland for the meeting. He was an old Glasgow man, and an old Scottish Junior; and on this account he very highly appreciated the honour they had conferred upon him in electing him an honorary member. It was true that he had been the first Secretary of the Western District Branch; and he was glad if his work in that capacity had proved serviceable. The older one got, the greater became one's pride in looking back to the early days; and certainly some of his happiest recollections were associated with the meetings of the Scottish Juniors. He hoped the Association would continue to make headway. Proceeding with his address on "The 'Second Mile' in Salesmanship" (which was similar to that delivered by him some years ago before the London and Southern District Junior Gas Association, a full report of which will be found in the "Journal," Vol. CXXVIII., p. 473), Mr. Mason observed that salesmanship was a subject in which every worker should be interested. Whether or not they realized it, the fact remained that they were all salesmen, in whatever capacity they might be employed in their respective undertakings. Some men in the gas industry thought that the most effective factor in salesmanship was "cheap gas"—so effective, indeed, that all others might be ignored. While not for a moment decrying the value and power of a low price, he believed most emphatically that good service and moderate price would gain more business than low price and poor service. He took it that, as members of a Junior Association, they were eager to discover the golden key that would open the door of a successful business career. True education and the highest success lay more inside than outside a man, and were revealed in growth of mind, wider resources for usefulness, broader outlook, and extended horizon, greater consideration and real sympathy for the feelings, aspirations, faults, and failings of other people, with an ever-increasing lifting power for the individual community about him. The man who developed along these lines, even if he was never recognized nor recompensed at his worth, was the truly successful man, because he had succeeded in building the only thing that moth and rust had no power to corrupt—"character."

Not long ago he had a conversation with one of the most influential men, as regards selections for big positions, in the gas industry. This gentleman told him that recently he had been asked to nominate men for three important, high-salaried posts, all with excellent future possibilities. Those wanted were not engineers, but men with some practical knowledge, *plus* business training, and ability, initiative, and push. Though the gentleman referred to knew more individual gas men than any other connected with the industry, he explained that he had great difficulty in finding six names that he could with any confidence recommend. There was much cause for thought in such a statement. Was there not also a tremendous incentive for progressive juniors to fit themselves, not only for doing efficiently the immediate work for which they were responsible, but for that big post that would probably come along sooner than they imagined? He made bold to assert that the men required at the top to-day were those who were not only experts in their own particular section, but who, profiting by experience or by educational culture, had broadened and developed their minds so that they were able to grasp general business principles. The successful manager of the future would be the man who was not merely content with getting his production or manufacturing costs right, but who would be capable of tuning-up the public service side of his concern and developing the business-getting organization. Did they not remember with pride that some of the men who had done most for the gas industry had been men born, not with silver spoons in their mouths, but with determination in their hearts to make the most of their opportunities? Such names as William Murdoch, George Livesey, Thomas Newbigging, and Corbet Woodall would always have an honoured place in the annals of the industry.

Good salesmanship was incomplete without good service. If any link in the service was defective, the best publicity in the world would not make up for the deficiency. Good service was absolutely necessary, because it included the three essentials of complete salesmanship: First, the machinery for handling orders when they came (including a trained and competent staff of clerks, fitters, and inspectors); secondly, the provision of means for demonstrating to the public the various forms of apparatus at their disposal, and educating them as to how appliances may be used with the greatest advantage to them; and, thirdly, the organization of good publicity. These three links were each vitally connected with one another, and must be complete, if business was really to progress.

The proceedings terminated with a vote of thanks to Mr. Mason for his address.

Later in the evening, the members met together in a social capacity, under the chairmanship of Mr. Cubie.

Brixham Gas Company.—The report submitted at the meeting of the Company—Mr. W. A. Scott presiding—showed a profit of £3902 on the gas business and a loss of £32 on the electrical side. After paying interest on debentures and loans, the interim dividend to June, and placing money to reserve, &c., there remained a balance of £1563. Out of this, the Directors had met the preference dividend to Dec. 31, 1921; and they recommended the payment of a dividend on the ordinary shares at such rate as the Board of Trade permitted—the balance to be carried forward. The report was adopted.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

North British Association Discussion.—A Correction.

SIR,—On reading over the report of my remarks on the papers read at the meeting of the North British Association of Gas Managers in Kilmarnock, on Friday last, I observe a misquotation in my final sentence, on p. 98 of the "JOURNAL" dated April 12, which reads as follows:

> "After all, there was a trained official or accountant who could assess in pounds, shillings, and pence the real value of a satisfied community."

This last sentence was expressed interrogatively; but the two words "was there" on which the note of interrogation hangs have been transposed in your report, and read "there was." The sentence ought, therefore, to read as follows:

> "After all, was there a trained official or accountant who could assess in pounds, shillings, and pence the real value of a satisfied community?"

I think it will be quite evident to you that this slight alteration of the sentence conveys the actual meaning of my remarks.

Glasgow Corporation Gas Department, April 13, 1922.

J. W. M'LUSKY, General Manager.

Capital Issues.

SIR,—It is probable that in the near future there will be a good many new issues of capital by gas companies. It is to be hoped that those contemplating issues will not offer the public too generous terms, as such is not in the interests of the industry—resulting, as it does, in the cost of the new capital being unnecessarily heavy, and consequently deferring reductions in price of gas.

At the same time, such terms create hardship upon existing gas stockholders, by leading investors to look for high yields on gas stocks, thus keeping down the market prices of existing stocks. Further, too generous terms by any undertaking make difficulties for others desirous of raising capital as cheaply as possible.

T. P. RIDLEY.

Newcastle-on-Tyne, April 15, 1922.

REGISTER OF PATENTS.

Extraction of Sulphur.—No. 174,143.

JOHNSON, J. Y., of Lincoln's Inn Fields; communicated by the Badische Anilin & Soda Fabrik, Ludwigshafen-on-Rhine.

No. 28,895; Oct. 12, 1920.

This invention relates to a process and apparatus for the extraction of sulphur from masses containing it in the free state, such as exhausted gas purification masses. It is based on the known fact that sulphur readily dissolves in ammonium sulphide solution, and has for its object a very advantageous method of commercially employing ammonium sulphide for the purpose.

The patentee is aware of the specifications of prior patents Nos. 1415 of 1914 and 13,383 of 1911, and makes no claim to anything described therein. He claims: (1) A process for the extraction of sulphur from active charcoal containing free sulphur which has served for the removal of sulphur from gases, consisting in passing through the mass ammonium sulphide produced from its aqueous solution by distillation and condensation; the whole operation being preferably effected in a closed cycle. (2) The employment of a separate receiver in which the ammonium sulphide running from the charcoal can be collected when the extraction is completed, so that on continuing the distillation the charcoal is washed with condensed pure water. (3) The addition to the liquor contained in the distilling vessel of an electrolyte—preferably an alkali salt which is inert towards ammonium sulphide. (4) Apparatus consisting of a distilling vessel, a condenser, and an extraction vessel, with or without a separate receiver and pipe connections; the inner surface of each part exposed to ammonium sulphide solution being of an aluminium-containing metal.

Carbonizing Coal and the Like.—No. 175,670.

LEWIS, G. P., of Westminster.

No. 25,151; Aug. 31, 1920

This invention relates to the distillation of fuels of more recent origin, such as lignites, brown coal, and peat. The dried material, reduced to a powder, is mixed with a suitable hydrocarbon to form a paste, which is ground until the solid matter is reduced to colloidal dimensions, and is then converted into a liquid by the addition of a suitable liquid hydrocarbon. The colloidal liquid is passed under pressure through heated piping, and is then injected into a chamber in which the greater portion of the colloidal liquid is vaporized. The vapours are immediately led into a condenser, and the resultant liquid separated from the permanent gases produced by the combined effects of high temperature and pressure in the pipes.

The unvaporized colloidal liquid in the chamber may be withdrawn for use as liquid fuel or other purposes. However, the chamber may be maintained at such a temperature that further vaporization takes place, whereby the resultant semi-liquid mass is brought into a suitable condition to act as a binder in the manufacture of briquettes. The briquettes may be distilled in a retort to give a good yield of gas, oil, ammonia, and hard coke, or may be completely gasified in any suitable form of gas producer or in a combined retort and gas producer.

Thermostatic Devices for Gas-Ovens.—No. 155,788.

AMERICAN STOVE COMPANY, of St. Louis, assignees of MEACHAM, B. E., of Lorain (Ohio).

No. 36,105; Dec. 23, 1920. Convention date, July 7, 1919.

This invention relates to fuel-regulating devices for gas-ovens of the kind comprising a control valve adapted to co-operate with an adjustable seating and operated thermostatically. The fuel-regulating devices comprise a stationary externally screw-threaded nipple, a hollow longitudinally adjustable nipple enclosing the stationary nipple and screw-threaded thereto (the adjustable nipple having a contracted end with an opening), a valve wholly within the adjustable nipple to control the opening, a thermostat within the oven, a connection between the thermostat and the valve, and a regulating member connected with the adjustable nipple.

Gas-Fired Pottery Kilns.—No. 176,419.

WOODALL, DUCKHAM, & JONES (1920), LTD., and DUCKHAM, Sir A. M'D., of Grosvenor Gardens, S.W.

No. 28,248; Oct. 5, 1920.

In gas-fired pottery kilns of the chamber type the gas and air are generally conducted from flues in the bottom of the kiln chamber into a small chamber adjacent to the inner face of the kiln chamber wall and having in its outer wall numerous ports through which the hot products of combustion stream across the kiln chamber. This small chamber is technically known as the gas-bag. Sometimes there is a gas-bag on each of opposite sides of the kiln. The very high temperature attained in the gas-bag damages the adjacent wall of the kiln chamber rendering frequent renewal necessary. When there is only one gas-bag the goods near it are liable to be over-fired if those more removed are sufficiently fired. Though this objection is obviated by the use of two gas-bags, such use increases the cost of construction.

By this invention the gas-bag is placed on the middle line of the kiln chamber, and has the necessary gas ports on each of its longitudinal side faces. The waste gases are removed along the side walls of the chamber where, having passed over the goods, they have lost a large portion of their heat.

The middle position of the gas-bag necessitates modification of the general arrangement of flues. Preferably the long rectangular kiln is divided into two sets of chambers by a longitudinal partition which accommodates the waste-gas flues from both sets of chambers, the air and combustible gas flues being in the outer walls.

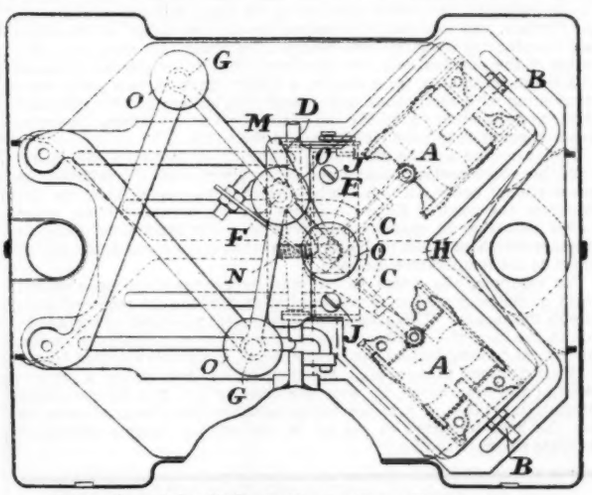
Protecting the Mechanism of Dry Gas-Meters. No. 176,076.

HIBBERD, C. E., and GOAD, F. L., of Westminster.

No. 33,019; Nov. 23, 1920.

It is the object of the present invention to eliminate in dry gas-meters wherein a subsidiary case is not provided for the valves and appertaining parts the adverse effects of condensation. The invention consists in protecting means disposed above the parts and furnished with a depending portion.

The illustration is a plan of the working parts in the upper part of the main casing above the diaphragm chambers: (1) slide-valves A, A, with guide rods B, B; (2) slide-valve gratings; (3) valve arms C, C; (4) a worm-wheel spindle which drives the index spindle; (5) a tangent spindle E; (6) a tangent pin F; and (7) a pair of long arm pins G, G. As regards the protection of items (1) to (4), there is provided a cover H of sheet metal secured by screws J, J to the bracket carrying the bearings of the tangent spindle E and of the worm-wheel spindle D driving the index spindle. The cover is of sufficient size to shield



Hibberd's and Goad's Protection for Meter Working Parts.

all these parts, and its edge is bent downwards to ensure that any moisture condensed thereon or dripping thereon from above will drip clear of the working parts. The cover may, in some cases, be permanently fixed; but it is preferable that it should be removable, as described, in order that access may be had to the covered parts. As shown, it is slotted at M to permit of being placed in position without

disturbing the tangent spindle E, the slot being so positioned that it does not rest above the worm wheel N. Thus the latter is duly shielded.

As regards items (5) to (7), dished discs O, whose diameter is greater than that of the bearings to be protected, are secured concentrically to the respective spindles E, G, and F. Each cap O is fitted with its dished rim projecting downwards. These long-arm pin and tangent spindle caps may be screwed in position, or soldered or otherwise permanently secured.

Detection and Measurement of Gases.—No. 176,574.

DAYNES, H. A., and THE CAMBRIDGE AND PAUL INSTRUMENT CO., LTD., of Cambridge.

No. 1117; Jan. 8, 1921.

Specification of patent No. 124,453 describes an apparatus including a Wheatstone bridge system and a pair of electrically heated wires for the detection and measurement of gas by comparison with another gas—the latter serving as a standard of comparison. This invention seeks to avoid the difficulty that where more than one other gas is present in company with the gas whose detection and measurement is desired, sources of error are introduced into the results attained owing to variation in proportion in which such other gases are present.

In carrying the invention into effect in one form (as applied, for example, to the detection and measurement of the carbon dioxide present in flue gases), there is provided as in specification No. 124,453 a metal block with two separate cavities containing similar wires. One of the cavities contains as a standard of comparison an average sample of air and an excess of water; the cavity being closed and rendered air-tight by means of a screw cap. An excess of water is maintained within this cavity by furnishing therein a quantity of free water or, alternately, a quantity of absorbent material such as glass wool, which is impregnated with water. Replenishment of water may be effected when required, say at intervals of six months. The other cavity is accessible to the flue gases in which (say) the predominating gases are carbon monoxide, nitrogen, oxygen, carbon dioxide, and water vapour.

Either the metal block is cooled or preferably the flue gases are cooled by being conducted from the hot flue through a sufficient length of metal piping to ensure that the water-vapour present in the flue gases is sufficient to saturate completely the latter at the temperature at which these gases become accessible to the cavity containing the second hot wire. The two cavities being small and adjacent in a single metal block, there are assured equality of temperatures between their gaseous contents; and in the first cavity a gas saturated with water-vapour at the same temperature as the second cavity—that is, equal amounts of water-vapour present in both cavities. Hence although the hydrogen content—and consequently also the water-vapour content—of the fuel may vary, the effect of the latter gas in the instrument is eliminated; and as the effects of air, nitrogen, oxygen, and carbon monoxide are practically indistinguishable from one another compared with the relative effects of water-vapour and carbon dioxide, the apparatus will give directly the percentage of carbon dioxide in the flue gas irrespective of variations in the water-vapour content of the flue gases.

Gas Producers Utilizing Waste Heat.—No. 176,113.

KOPPERS, H., of Essen-Ruhr, Germany.

No. 33,674; Nov. 29, 1920.

The patentee states that very great difficulties are experienced with gas producers, particularly if furnished with a revolving grate, in connection with the firebrick lining of the furnace chamber. By the use of a cooling jacket, a considerable amount of heat is lost, and corrosive action takes place on the iron shaft below the fire zone. Careful investigation has shown this due to the steam injected with air into the furnace, and also steam generated by the hot ashes in the water seal, condensing upon the iron casing. To obtain an economic utilization of the surplus heat, the producer shell is frequently designed as a steam boiler—as, for example, a boiler made in two parts communicating with each other, one round the bottom of the generator shaft, and the other round the top of the shaft or at the side. In these, steam is generated in the jacket around the shaft.

This invention aims at preventing evolution of steam in the jacket itself, but nevertheless maintaining it at about 100° C., sufficient to prevent local cooling which would give rise to condensation on the casing of the shaft. Either a liquid having normal boiling point higher than that of water is employed or water maintained under a pressure which so raises its boiling point that there is no evolution of steam at the temperature attained.

For example, the water jacket may be connected to an elevated drum or boiler placed at such a level as to produce the required pressure in the jacket. This arrangement possesses a further advantage in that in the case of a producer plant comprising a plurality of units, the several cooling jackets can be connected to a single elevated boiler or drum common to them all. When using a liquid having a higher boiling point than water, for example heavy oil, it may be circulated through the tubes of a steam boiler separate from the producers, so that the heat imparted to the oil in the cooling jackets serves to generate steam in the boiler.

Pontypool Gas and Water Company.—The annual meeting of the Company was held last week, Mr. Benjamin Nicholas presiding, in the absence through illness of Mr. T. Deakin. The Chairman stated that the Abersychan gas undertaking had been acquired, and the Company now supplied three urban district areas. A proposal had been made to call-up £5000 of additional capital. It was decided to pay a dividend of 7½ p.ct. on the "A" shares, and 5 p.ct. on the "B," "C," and "D" shares, less tax.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

Progress of Bills.

Blackburn Corporation Bill: The further Standing Orders have been complied with. Read a second time, and committed.

Bolton Corporation Bill: Reported from the Select Committee, with amendments. Read the third time, passed, and sent to the Commons.

Croydon Gas Bill: Standing Orders complied with. Read a second time, and committed.

Sheffield Gas Bill: Brought from the Commons, read the first time, and referred to the Examiners.

Gas Regulation Act, 1920 (Special Orders).

In the House of Lords last week, it was moved by Lord Somerleyton that the drafts of Special Orders proposed to be made by the Board of Trade under section 10 of the Gas Regulation Act, 1920, on applications by the Borough of Calne, Grays and Tilbury Gas Company, Romford Gas and Coke Company, Ltd., Wellington (Salop) Gas Company, Weston-super-Mare Gas Company, and the Hessle Gas Light and Coke Company, be approved; and this was agreed to. A similar resolution was moved by Sir William Mitchell-Thomson in the House of Commons, and passed.

Copies were presented of drafts of Special Orders proposed to be made by the Board of Trade under section 10 of the Act on applications of the Hessle Gas Light and Coke Company, and the Rhymney and Aber Valleys Gas and Water Company.

HOUSE OF COMMONS.

Progress of Bills.

Birmingham Corporation Bill: Reported, with amendments, from the Local Legislation Committee.

The Standing Orders not previously inquired into have been complied with in the case of the Doncaster Corporation Bill, which is to be read a second time.

Sheffield Gas Bill: Read the third time, and passed.

Stoke-on-Trent Corporation (Gas Consolidation) Bill: Read a second time, and committed. Referred to the Committee on Unopposed Bills.

Windsor Gas Bill: Referred to the Committee on Unopposed Bills.

Gas Mains and Subsidences at Abertillery.

Mr. G. BARKER asked the Secretary for Mines if he had seen a report of the Abertillery Urban District Council for March 27 last, in which it was stated in the Gas Committee's report that the cost of repairing leakages during the month caused by subsidence was £33, besides a large quantity of gas being lost; that a councillor stated that during the past year repairs to his house caused by subsidence had cost him more than £60 for damage, over which he had no control and no legal remedy, and that during the past ten years he believed it had cost the Council over £10,000 for damage to their buildings, water, and gas mains, and the breaking-up of the roads, and that at the beginning of that Council's term of office no less a sum than £500 was put in the estimates to deal with subsidence; and that the Council's Accountant estimated that, but for subsidence, they could have reduced the price of gas 2s. 6d. per 1000 c.ft. Would he, therefore, send a representative of His Majesty's Government to this district to investigate the conditions and report; and would he bring in the Bill, long overdue, to remedy this deplorable state of things arising from subsidence?

Mr. BRIDGEMAN (the Secretary for Mines) said the report referred to had not previously been brought to his notice. His Department were in consultation with the Ministry of Health on the possibility of introducing legislation to deal with surface damage from mining operations; but he was unable at present to say when such legislation was likely to be introduced or what form it might take. In regard to sending a Government representative to investigate the conditions, that was a question which should be asked of the Minister of Health.

Coal Smoke Abatement.

Sir A. HOLBROOK asked the Minister of Health if he would consider the desirability of introducing legislation to give effect to the recommendations of Lord Newton's Departmental Committee on coal-smoke abatement.

Sir A. MOND replied that a Bill was being prepared; but he could not say whether it would be possible to find time for its introduction.

SALE OF COKE BY GAS UNDERTAKINGS.

The Birmingham Corporation Bill was before the Local Legislation Committee of the House of Commons, presided over by Sir William MIDDLEBROOK, on Tuesday, April 11. [Particulars of the Bill were given in the "JOURNAL" for Jan. 11 last, p. 80.]

With regard to the provisions for the sale of coke, Mr. W. E. TYLDESLEY JONES, K.C., for the promoters, said that the clause for regulating the sale of coke under 2 cwt. in quantity was the same as in the Liverpool Corporation's Act of 1921. Sub-clause 4, however, was not in accordance with the Liverpool Act. The sub-clause read:

> "Every person who shall sell, offer, or expose for sale, or cause to be sold, offered, or exposed for sale, at any wharf, yard, or other place, coke in any quantity not exceeding 2 cwt., and not contained in sacks as required by sub-section (1) of this section, shall not deliver to the purchaser a less quantity of coke than is agreed to be sold."

The Committee could not see why this was necessary; and it was accordingly deleted.

MISCELLANEOUS NEWS.

GAS REGULATION ACT APPLICATIONS.

The following further notices have appeared in the "London Gazette" with regard to applications to the Board of Trade under the Gas Regulation Act.

Castleford and Whitwood Gas Light and Coke Company.

The standard price now authorized in respect of the supply of gas by the undertakers is 4s. 7d. per 1000 c.ft.; and the price they have asked the Board of Trade to substitute for this is 1s. 5·6d. per therm.

Draycott Gas Company.

The standard prices now authorized in respect of the supply of gas by the undertakers are 4s. 6d. per 1000 c.ft. supplied within a radius of 1230 yds. from the centre of the existing gas-works at Draycott, and 5s. beyond this radius; and the prices which they have asked the Board of Trade to substitute for these are 1s. 7·2d. and 1s. 8·2d. respectively.

Long Eaton Gas Company.

The standard prices now authorized in respect of the supply of gas by the undertakers are: (1) In respect of capital raised before the commencement of the Long Eaton Gas Act, 1901, 5s. 2d. per 1000 c.ft. within the township of Long Eaton, and 6s. 2d. beyond that township. (2) In respect of capital raised after the commencement of the Long Eaton Gas Act, 1901, 4s. per 1000 c.ft. within the township of Long Eaton, and 5s. beyond that township. The prices which the undertakers have asked the Board of Trade to substitute for those prices are: (1) In respect of capital raised before the commencement of the Long Eaton Gas Act, 1901, 1s. 5d. per therm within the township of Long Eaton, and 1s. 7d. beyond that township. (2) In respect of capital raised after the commencement of the Long Eaton Gas Act, 1901, 1s. 2·2d. per therm within the township of Long Eaton, and 1s. 4·5d. beyond that township.

GAS LIGHT AND COKE COMPANY'S SPECIAL ORDER.

London County Council Oppose Certain Clauses.

The following report was submitted by the Parliamentary Committee to last week's meeting of the London County Council, on the subject of the application to the Board of Trade by the Gas Light and Coke Company, under section 10 of the Gas Regulation Act, for a Special Order for various purposes.

The Order seeks to authorize the acquisition by the Company of the undertaking of the Ilford Gas Company, and to confer other powers incidental thereto. It is also proposed by the Order to confer upon the Gas Light and Coke Company, in respect of the whole of their area of supply, power (i) to lay pipes through parts of premises for the supply of other parts in different occupation; (ii) to specify the size and material of the pipes and require that notice of any such work shall be given to the Company, and that the Company shall be empowered to approve or disapprove such work; (iii) to make a minimum charge, not exceeding 25s. in any one quarter, for a supply of gas laid on for the purpose of a stand-by in premises in which there is also a separate supply of electricity or gas, whether for lighting or power; and (iv) for certain minor purposes.

The proposal to acquire the undertaking of the Ilford Gas Company does not appear to affect adversely the position of the gas consumers in London. Certain of the other proposals are, however, open to objection. It is proposed, under clause 34 of the Draft Order, that the Company should be given wide powers, to operate throughout the whole of their area, to lay pipes through any part of any premises in order to supply gas to some other part in different occupation. There is no provision requiring the consent of the owner of the part of the premises affected, and apparently neither the owner nor the occupier is to be consulted as to the position or manner in which, or the time at which, the pipes are to be laid; and, further, the Company are only required to give to the owner and occupier 24 hours' notice of their intention to lay the pipes. We are advised that there is no precedent for such a provision; and it appears to us to be unreasonable.

By clause 35 of the Order, power is sought to enable the Company "to specify the size and material of the pipes with the fittings thereof which are to be laid by the owner or occupier of any premises on those premises, either in the first instance or on the occasion of any renewal." The clause also requires that notice of any such work shall be given to the Company, and that the Company shall be empowered to approve or disapprove of such work, and to refuse a supply of gas in the event of the work being disapproved. Provision is made for an appeal to a Petty Sessional Court against a refusal to supply gas. The principle embodied in the clause does not appear to be unreasonable; but the details are open to objection. The specification prepared by the Company should not, in our opinion, be operative until it has been confirmed by the Board of Trade after public inquiry, if necessary; and it would appear to be desirable that appeals should be to a special tribunal, and not, as proposed, to Petty Sessional Courts. The clause also requires that the meter shall be "within the outside walls of the building." This provision would appear to need amendment. We understand that at the Council's schools there is usually a separate building used as a meter-house.

It has been represented by the Wandsworth Metropolitan Borough Council that the provision, in clause 42, which seeks to enable the Company to make a minimum charge, not to exceed 25s. a quarter, for a stand-by supply, is not in the best interests, of the consumers; and the Borough Council ask the Council to oppose the proposal. Such a provision is now allowed in Gas Orders and Acts, and is invariably inserted in Electric Lighting Acts and Orders. The provision of stand-by supplies involves, not only the cost of connecting the consumers' premises with the main, but places the Company in the position of having to provide for sudden increases in the consumption of gas when the stand-by supplies are used. This may involve capital expenditure which would, in the absence of a minimum charge, be unremunerative, and would place a burden upon the undertaking which would fall mainly upon the general body of gas consumers in the Company's area. It would appear to be to the advantage of consumers as a whole that each one should, as far as possible, bear the cost of the supply given to, or provided for him; and it is apparently contemplated that the charge should vary according to the extent of the supply provided for. The Public Control Committee are of opinion that it would not be in the interests of consumers generally to oppose the proposal; and we concur in this view. We recommend: "That the Gas Light and Coke Company Draft Special Order be opposed, with a view to securing the rejection of clause 34 (power to lay pipes through parts of premises for supply to other parts), and amendment to clause 35 (as to construction and placing of pipes, &c.)."

The report was received, and the recommendation of the Committee was adopted by the Council without discussion.

BRIDGWATER GAS LIGHT COMPANY.

Feeling allusion was made by the Chairman (Mr. R. Y. Foley, J.P.), at the annual meeting of the Company, to the death in May last year of Mr. J. H. Cornish, who had served the Company faithfully and well for 45 years as Manager and Secretary, while for a further period of 17 years he had acted as a Director. A resolution was unanimously passed placing on record the stockholders' appreciation of the great services rendered to the Company by Mr. Cornish. Dealing with the past year, the Chairman said that fortunately the Company, in continuity of their usual policy, were carrying good stocks of coal at the beginning of the miners' dispute; and it was not until the end that it was deemed prudent to order a few hundred tons of foreign coal, some of which was delivered long after the dispute had ended and English coal was again available. The Company were thus able to maintain a full supply of gas throughout the stoppage. No reduction of pressure was made, and no restrictions whatever were imposed on the consumers. The gas from the foreign coal cost in the neighbourhood of 10s. 6d. per 1000 c.ft. to produce; but the Company did not raise the price. Under their Order, the Company had declared 450 B.Th.U. as their calorific power; and the therm would be charged for at 13·33d., or equal to 5s. per 1000 c.ft. The price of coal had fallen a little, and there was a tendency for railway rates to be decreased, while labour costs also had gone down somewhat. It was hoped that, if events turned out as anticipated when next the Company were contracting for the year's coal supplies, they would be able to announce a considerable reduction in the price of gas. In proposing the re-election of Mr. J. H. Cornish as Secretary and Manager, the Chairman said the new Order had entailed a lot of extra work by Mr. Cornish and his staff; and the coal stoppage had created extraordinary difficulties in the maintenance of the gas supply of the town. But these were all surmounted with the loyal co-operation and help of the men at the works. The thanks of the stockholders were due to all the workmen for the good and loyal service given throughout the year. This goodwill of the workmen was recognized by the bonus and pension scheme, which gave them an added interest in the Company's welfare. Mr. Cornish was engaged on plans for improving the supply of gas in the parts of the town most distant from the works; and he hoped, by the laying of a high-pressure main to certain points, to equalize the pressure in the pipes all over the district. Dividends were declared making for the year 13¾ p.ct. on the "A" stock and 6⅞ p.ct. on the "B" and "C" stocks.

West Bromwich Gas Charges.—A reduction of 6d. per 1000 c.ft. in the price of gas was adopted at a meeting of the West Bromwich Town Council last Wednesday week, when it was also decided to apply for an Order providing for the therm basis of charge.

Quality of Gas at Coatbridge.—Mr. R. T. Thomson (the Gas Examiner appointed by the Town Council of Coatbridge and the County Council of Lanarkshire) has issued a report, in terms of the Gas Regulation Act, certifying that, in the quarter ended March 31, the gas supplied by the Coatbridge Gas Company in the districts of the local authority has been tested by him, with the following results: Average calorific value for the quarter, 462·1; number of days on which the calorific value was deficient by 6 p.ct. or more, none; sulphuretted hydrogen present on no day; number of testings in which the pressure was less than 2 in., none. The Company had given notice of their intention to supply gas of a calorific value of 450 B.Th.U.; and Mr. Thomson certifies that they have fulfilled their statutory obligations.

Disconnecting a Meter.—At the local Police Court last week, the Wolverhampton Gas Company summoned a consumer named George H. Marshall for disconnecting a meter without giving 24 hours' notice in writing. Mr. Gosling, who prosecuted, said that defendant could not get any light owing to a penny becoming lodged in the meter; and he then disconnected the inlet and outlet pipes and joined them together, so that a supply of gas was obtained without passing through the meter. There was no suggestion of dishonesty, as the defendant reported the matter the next morning; but the Company took proceedings so that it should be known they could not allow their property to be tampered with. Such action opened the way to danger. Defendant said he had sublet his rooms in his house to a married couple; and the wife was in a critical condition. He gave the husband permission to disconnect the meter, in order to get light for the night. It happened on a Sunday; and witness did not know anyone would be at the gas office. Evidence was given by the lodger, who said he was an engineer, and said there was no danger in what he had done. The Magistrates asked if the prosecution wished to press the case, and Mr. Gosling said only on the ground that there must be no manipulation of their property. After some discussion, the Bench fined the defendant 10s.

CO-PARTNERSHIP AT CROYDON.

A Revised Scheme Inaugurated.

The Directors of the Croydon Gas Company have for some time past had under consideration the question of reinstating the co-partnership bonus, which has been in abeyance since June, 1921, and of calculating it (at a revised and increased rate)—as also pensions—upon total earnings, instead of, as during the past few years, upon pre-war rates of pay. As on many occasions a desire has been expressed by employees to make, through the Company, provision for their widows and orphans, several of the Directors, with the Chief Officers, met a number of representative employees, in order to ascertain whether such an arrangement (which could only be made if it applied to all co-partners) would be acceptable to the majority of the employees. Having by this means become satisfied that an overwhelming majority were desirous of making this provision, the Directors decided to bring into operation from March 31 a new scheme applicable in the case of each eligible employee who might signify his desire to serve under it. Every employee in the permanent service of the Company has elected to come under the scheme. There are in all about 700 of these employees. Those who were co-partners in June, 1921, will participate in the co-partnership bonus (at 4 p.ct.) up to March 31 last. The following is a brief outline of the new scheme which came into operation on that date. It will be applicable in its entirety to every co-partner.

The Bonus.—This will be at the rate of 6 p.ct. until the provisions of the Company's Bill now before Parliament become operative. From that time it will be at the same rate as that of the dividend paid upon the new sliding-scale stock of the Company, which will probably be, to start with, 6 p.ct. Bonus, as also the member's contributions to the pension, widows and orphans fund, will be calculated on the total remuneration of co-partners, excluding overtime.

Agreements of Service entitling Employees to Membership.—These will be for the periods which may be specified in them, and on their conclusion will continue until one month's notice in writing on either side, expiring on any date, be given to terminate them, unless in case of dismissal for any sufficient reason.

Application of Bonus when credited to Co-Partner.—There will first be deducted such sum as, with the deductions already made from his remuneration, shall amount to his contribution to the fund for the preceding year, or lesser period. The remainder will, provided the co-partner holds not less than £5 stock in the Company, be under his control, and the whole can be withdrawn or applied to the purchase of stock as and when he wishes, on notice being given to the trustees. Amounts up to £2 can be drawn on demand at the Co-Partnership Office, Katharine Street. For larger sums than £2 such notice—not exceeding 14 days—must be given as the trustees may require. In the case of a co-partner who has not a holding of £5 or upwards of the Company's stock, the remainder of the bonus will be retained on his behalf by the trustees, who will credit him with interest at such rate as the Directors may from time to time determine—(at present 5 p.ct. per annum). Amounts can, as heretofore, be paid in at any time in cash, or by deduction from salary, as the co-partner may from time to time determine.

Contributions to Pension, Widows and Orphans Fund.—This will be for new members at the rate of 3 p.ct. (or if over 30 years of age on joining, 4 p.ct.) on the total remuneration, excluding overtime; but in the case of those who were members of the staff superannuation or of the co-partnership pension fund on March 31, 1922, they will continue to pay at the same rates as they were then doing. In each case a further 3 p.ct. will be payable by co-partners in respect of the provision for widows and orphans. The Company will contribute an amount each year equal to that of the members, excluding the last-named 3 p.ct.

Method of Payment.—One-third of the above contribution will be paid by weekly or monthly instalments, calculated to the nearest penny, but disregarding fractions. The balance of the amount at the end of the co-partnership year or on the termination of an agreement, will be charged against the bonus.

Pensions to Members, their Widows and Orphans.—No member will be entitled to these until he shall have contributed for a period of ten years, either to the existing staff superannuation or the co-partnership pension funds; but the Directors will, in the case of present co-partnership employees of ten years' service and upwards, decide what allowance shall be made, having regard to all the circumstances of the case. If such allowances shall on their cessation have been of less total amount than his contributions, *plus* 4 p.ct. compound interest, the difference will be paid to his legal representative, or, if there be none, it will be applied as the Directors may determine.

Members leaving Service.—If a member voluntarily resigns from the Company's service (otherwise than to escape dismissal for fraud or dishonesty), or is dismissed for any reason other than fraud or dishonesty, he will receive his own contribution with 4 p.ct. compound interest.

Members Dying while still in the Company's Service.—If a member dies while in the Company's service, leaving neither widow nor orphan, the amount of his contribution, *plus* those of the Company, will be paid to his legal representatives; or, if none, it may be applied as the Directors may determine. If the pension to widow and/or orphans shall on cessation have amounted to a less sum than his and the Company's contributions, the difference will be dealt with as the Directors may determine.

Members Dying after being pensioned.—If a member, having received a pension, dies, and the amounts paid to him as pension, *plus* such amounts (if any) as may have been subsequently paid to his widow and for orphans, shall have amounted to less than his own contributions with 4 p.ct. compound interest calculated up to the date he was pensioned, the difference will be dealt with as the Directors may determine.

Scale of Pension on Retirement on or after reaching 65, or on failure of health, or through any general re-arrangement of employees.—This will be

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